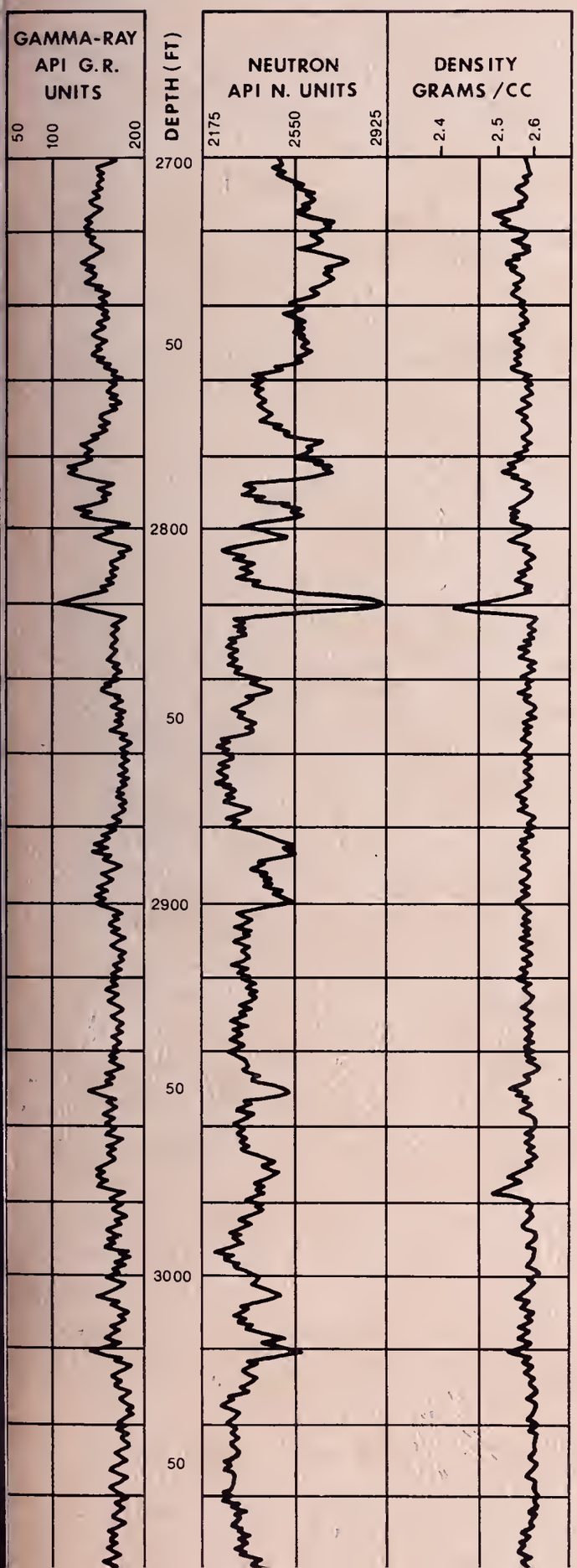
PY G345/4.17/8
No. 198
1985
C.2

STATE LIBRARY OF PENNSYLVANIA
docs,pa PY G345/4.17/8no.198
Oil and gas developments in Pe
C.2
0 0001 00584841 9

JUL 17 1986

Progress Report 198

1985



OIL AND GAS DEVELOPMENTS IN PENNSYLVANIA IN 1984

John A. Harper

STATE LIBRARY OF PENNSYLVANIA
DOCUMENTS SECTION

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF ENVIRONMENTAL RESOURCES
OFFICE OF RESOURCES MANAGEMENT
BUREAU OF
TOPOGRAPHIC AND GEOLOGIC SURVEY
Arthur A. Socolow, State Geologist

Digitized by the Internet Archive
in 2016 with funding from
This project is made possible by a grant from the Institute of Museum and Library Services as administered by the Pennsylvania Department of Education through the Office of Commonwealth Libraries

https://archive.org/details/oilgasdevelopmen00harp_2

Progress Report 198

OIL AND GAS DEVELOPMENTS IN PENNSYLVANIA IN 1984

by John A. Harper
Pennsylvania Geological Survey

PENNSYLVANIA GEOLOGICAL SURVEY
FOURTH SERIES
HARRISBURG
1985

Copyright 1985
by the
Commonwealth of Pennsylvania

Quotations from this book may be published if credit is given to
the Pennsylvania Geological Survey

ISBN: 0-8182-0074-X

ADDITIONAL COPIES
OF THIS PUBLICATION MAY BE PURCHASED FROM
STATE BOOK STORE, P.O. BOX 1365
HARRISBURG, PENNSYLVANIA 17105

CONTENTS

	Page
Abstract	1
Introduction	2
Acknowledgements	2
Production and reserves	2
Crude oil production	2
Developed crude oil reserves	2
Secondary and tertiary crude oil recovery projects	3
Natural gas production	4
Natural gas reserves	4
Natural gas storage areas	5
Oil and gas prices	5
Drilling and completion costs	5
1984 Drilling and completions	8
Total completions	8
Oil completions	10
Gas completions	10
Combination oil and gas well completions (not reported separately as oil or gas)	10
Dry completions	11
Service wells	12
Drilling and production activity (classified as shallow or deep)	12
Pennsylvania drilling and production records	15
Oil and gas exploratory and development activities	22
Exploratory wells	22
Development wells	22
Highlights of 1984 exploration and development	22
"Tight formation" developments	32
Geophysical activity in Pennsylvania	32
Activities on state forest and park lands	32
Pennsylvania's new oil and gas laws	32
Projects in progress in 1984, Oil and Gas Geology Division	33
Combined revision of filing and base-map procedures	33
Geology of the oil and gas fields of southwestern Pennsylvania	33
Oil and gas reservoir rocks of Pennsylvania	37
Open-file reports and other data available	37
Project published in 1984, Oil and Gas Geology Division	38
Petrology and reservoir characteristics of the Lower Silurian Medina Group sandstones, Athens and Geneva fields, Crawford County, Pennsylvania	38
Summarized records of reported deep wells in 1984	38

FIGURES

Figure	1. Crude oil production in Pennsylvania, 1984	2
	2. Oil wells and crude oil produced in Pennsylvania in 1983 and 1984, by counties	3
	3. Crude oil reserves in Pennsylvania, 1984	3
	4. Annual production of crude oil in Pennsylvania, 1859–1984	4
	5. Natural gas production in Pennsylvania, 1984	5

Page

Figure 6. Natural gas reserves in Pennsylvania, 1984 5
7. Production, consumption, and reserves of natural gas in Pennsylvania 6
8. Active natural gas storage areas of Pennsylvania 7
9. Crude oil prices in Pennsylvania, 1984 8
10. Natural gas price ceilings under federal Natural Gas Policy Act in 1984 9
11. New well completions and old wells drilled deeper in Pennsylvania, 1984 10
12. New oil well completions and old wells drilled deeper in Pennsylvania, 1984 ... 10
13. New gas well completions and old wells drilled deeper in Pennsylvania, 1984 .. 11
14. New combination oil and gas well completions in Pennsylvania, 1984 11
15. New dry hole completions and old well drilled deeper but completed dry in Pennsylvania, 1984 11
16. New service well completions in Pennsylvania, 1984 12
17. Shallow well activity, 1950–84 (Late Devonian or younger producing horizons; generally less than 4,000 feet) 13
18. Annual rate of deep formation exploration and development, 1930–84 (Middle Devonian or older producing horizons; generally more than 4,000 feet) 14
19. Drilling and completion of wells reported, 1984 (according to geologic age and depth of producing horizons) 15
20. Oil and gas well completions in Pennsylvania by shallow and deep producing formations, 1984 15
21. Gas production from rocks of Middle Devonian or older age in Pennsylvania, 1984 (classified as "deep" production) 16
22. Deep gas production in Pennsylvania in 1984 by producing formations 22
23. Production, unit price, and total value of crude oil and natural gas produced in Pennsylvania, 1960–84 23
24. Exploratory and primary development and drilling footages reported, 1984 and 1983 24
25. Exploratory drilling in Pennsylvania by classification and type of well, 1984 ... 24
26. Map of exploratory wells in Pennsylvania reported in 1984 25
27. Reported new field and new pool discoveries in Pennsylvania, 1984 26
28. Selected exploratory failures reported in Pennsylvania, 1984 27
29. Schematic diagram of Upper and Middle Devonian stratigraphic units from the surface and subsurface of western Pennsylvania 28
30. Two cross sections through Council Run field, Centre County 29
31. Generalized subsurface diagram of the major deep formations occurring in western Pennsylvania 30
32. Cross section showing the interpreted trapping mechanism for production in Greenley pool, Swails field, Erie County 31
33. Index maps of available 7½-minute oil and gas base maps 34
34. Types of mechanical logs and abbreviations 38
35. Summarized records of reported deep wells in 1984 that penetrated rocks of Middle Devonian or older age 40

OIL AND GAS DEVELOPMENTS IN PENNSYLVANIA IN 1984

by
John A. Harper

ABSTRACT

Pennsylvania's oil production totaled 4,824,966 barrels in 1984, a 7 percent increase over 1983 production. Oil reserves decreased 17 percent from 70,110,000 barrels in 1983 to 57,859,000 barrels in 1984. Leading counties for production of oil were Warren, Venango, and McKean. In 1984 secondary recovery of oil in the Bradford field accounted for only 16 percent of the state total.

Gas production increased 41 percent from 118,372 million cubic feet in 1983 to 166,342 million cubic feet in 1984. Gas reserves increased 1 percent from 1,854,477 million cubic feet in 1983 to 1,880,735 million cubic feet in 1984. Stored recoverable gas also increased 7 percent, to 620,709 million cubic feet.

The price for all crude oil and oil products declined in 1984 nationwide. The price of Penn Grade Crude oil was $28.00 per barrel on January 1, but dropped to $26.40 per barrel on November 14. New gas prices were subject to Natural Gas Policy Act price ceilings. The wellhead price of 1,000 cubic feet of natural gas ranged from a low of $0.29 under old contracts to $5.90 for "tight" gas (NGPA Section 107, High-Cost Gas). The average price for gas was about $3.25.

The total number of wells reported drilled in 1984 was 2,598, a 2 percent increase from 1983. Total footage drilled was 6,238,255 feet, a 16 percent increase. The total number of oil wells reported was 1,073, a decrease of 25 percent over the 1983 figure of 1,436. The most active counties for oil well drilling were Venango, Warren, Forest, and McKean, accounting for 92 percent of all oil wells drilled in the state. A total of 1,379 gas wells was reported in 1984, representing a 48 percent increase from 1983. The most active counties for gas well drilling were Erie, Indiana, Clearfield, Crawford, and Cambria, accounting for 71 percent of all gas wells drilled in the state. There were 40 combination oil and gas wells reported in 1984, an increase of 25 percent over 1983. Fifteen of these wells were drilled in Warren County.

Exploratory drilling in 1984 decreased by 30 percent, from 122 wells reported in 1983 to 86 wells reported in 1984. Development drilling increased 5 percent in 1984, to 2,466 wells. The success rates were 90 percent for exploratory drilling and 98 percent for development drilling.

Seismic exploration declined by 61 percent, from 23.6 crew-months in 1983 to 9.2 crew-months in 1984. Seismic crews operated in 17 counties in Pennsylvania during the year.

Present activity within the Oil and Gas Geology Division of the Bureau of Topographic and Geologic Survey includes continued revision of the oil and gas well-record files and the oil and gas base-map series, the conclusion of a two-year study of the oil and gas potential of southwestern Pennsylvania, and a new study on Pennsylvania's oil and gas reservoirs. The map and file revision project will result in the files and maps being revised to the state's permit numbering system, and the base maps being revised to 7½-minute scale from the present 15-minute scale. The southwestern Pennsylvania project includes detailed stratigraphic, structural, and petrographic studies of the oil and gas fields and reservoirs in the area. The purpose of the study is to encourage new drilling and production in southwestern Pennsylvania. The oil and gas reservoir study will detail the petrographic and petrophysical characteristics of the various hydrocarbon reservoirs that produce Pennsylvania's oil and gas. The purpose of the project is to provide operators with a guide to these reservoirs in order to plan for exploration and exploitation.

INTRODUCTION

The year 1984 was significant for the oil and gas industry in general, and for the industry in Pennsylvania in particular. It was the 125th anniversary of the drilling of Drake's oil well south of Titusville, a time of historical celebration, pageants, parades, and fireworks. It was also a year of decreasing crude oil and natural gas prices, of proposed new federal taxation, and of a new oil and gas law in Pennsylvania. This latter aspect is of most immediate importance to the Commonwealth's oil and gas industry, and is discussed in a separate section near the end of this report.

This annual report of oil and gas drilling and production in Pennsylvania is based for the most part on drillers' well records and location plats filed with the Bureau of Oil and Gas Management, Pennsylvania Department of Environmental Resources. The statistics of oil and gas drilling are compiled only from the records received during the calendar year. This includes records of wells drilled prior to, but reported in, 1984; it does not include 1984 wells for which records were submitted to the Commonwealth after December 31, 1984. Crude oil production and reserve figures are published through the courtesy of the Penn Grade Crude Association of Bradford, Pennsylvania. Ms. Mary Ann Gross, Equitable Gas Company, supplied data on natural gas production and reserves.

ACKNOWLEDGEMENTS

Grateful acknowledgement is extended to the following industry and government organizations, without whose help this report would have been impossible: American Gas Association; American Petroleum Institute; Appalachian Oil Scouts Association; Bureau of Oil and Gas Management, Pennsylvania Department of Environmental Resources; Bureau of Statistics, Pennsylvania Department of Commerce; Division of Minerals, Bureau of Forestry, Pennsylvania Department of Environmental Resources; Penn Grade Crude Association; and U.S. Department of Energy.

Special thanks go to all of the operators, companies, and personnel of Pennsylvania's oil and gas industry who released natural gas production statistics and mechanical logs, and who provided data on producing formations, intervals, drilling costs, and oil and gas prices.

The following staff members of the Oil and Gas Geology Division, Bureau of Topographic and Geologic Survey, are acknowledged: Cheryl L. Cozart and Christopher D. Laughrey, who assisted in the compilation of this report; and Lajos J. Balogh, who drafted the figures.

PRODUCTION AND RESERVES

CRUDE OIL PRODUCTION

Pennsylvania's crude oil industry produced 4,824,966 bbl (barrels) of Penn Grade crude oil in 1984, reflecting a 7 percent increase over the 1983 production total of 4,490,672 bbl. Most of this production was from Upper Devonian and Lower Silurian reservoirs, but there was some subsidiary production from Pennsylvanian and Mississippian reservoirs. Lower Silurian Medina Group sandstones in Erie and Crawford Counties produced 120,976 bbl of crude oil, an increase of 36 percent over the previous year. See Figure 1 for a summary of these statistics.

Figure 1. *Crude oil production in Pennsylvania, 1984.*

Penn Grade oil[1]	*1984*	*1983*	*% Change*	*Cumulative to 12/31/84*
Shallow oil[2]	4,704	4,402	+ 7	1,316,726
Deep oil[3]	121	89	+36	[4]1,296
TOTAL OIL	4,825	4,491	+ 7	1,318,022

[1]In 1,000 barrels.
[2]Shallow oil: from Late Devonian or younger rocks, generally less than 2,000 feet deep.
[3]Deep oil: from Lower Silurian Medina Group.
[4]Includes production of oil previously classified as "Corning Grade."

Figure 2 illustrates the amount of oil produced and the total number of producing oil wells in Pennsylvania in 1984, by county. Production statistics for oil in Pennsylvania's counties are based on commerce figures, the amount that is shipped or sold, rather than on the actual amount produced from each well. The leading counties for oil production during the year were Warren, Venango, and McKean, in that order, continuing a trend that has been established for a number of years. These three counties were responsible for 70 percent of the total oil produced in Pennsylvania.

DEVELOPED CRUDE OIL RESERVES

Developed crude oil reserves in Pennsylvania totaled 57,859,000 bbl at the end of 1984. This figure represents a 17 percent decrease from the 1983 total of 70,110,000 bbl. McKean, Venango, Warren, and Elk Counties ranked as the top four counties for oil

Figure 2. *Oil wells and crude oil produced in Pennsylvania in 1983 and 1984 by counties.*[1]

County	Crude oil production (barrels) 1984	1983	Number of producing oil wells 12/31/84	12/31/83
Allegheny	79,290	72,568	229	383
Armstrong	10,168	11,034	60	107
Beaver	48,464	31,278	67	93
Butler	66,936	67,227	464	1,222
Clarion	41,586	19,411	205	217
Clearfield	243	375	4	4
Crawford	116,138	83,904	180	126
Elk	545,855	428,138	52	171
Erie	4,838	4,814	99	80
Fayette	128	514	1	2
Forest	198,787	199,842	972	1,018
Greene	27,110	24,974	218	258
Indiana	3,962	3,240	129	117
Jefferson	4,899	3,489	41	21
Lawrence	173	80	2	2
McKean	759,502	827,935	7,598	[2]7,721
Mercer	9,298	9,145	90	88
Potter	21,703	19,749	98	98
Venango	903,016	832,408	3,822	4,291
Warren	1,295,296	1,207,129	4,877	5,089
Washington	94,707	94,392	279	604
Westmoreland	9,574	8,873	53	39
TOTAL	4,241,673	3,950,519	19,540	21,751

[1]Compiled by the Pennsylvania Department of Commerce, Bureau of Statistics.
[2]Revised figure.

reserves in the Commonwealth. Reserves were unchanged in Warren County and in the "southwestern district" (all of the counties south of Venango and Clarion Counties). New reserves were added in the "middle district" (Venango, Forest, and Clarion Counties), in Elk County, and in the producing areas of the Medina Group in Erie and Crawford Counties. Only the areas of crude oil production in McKean and Potter Counties had reserve declines, totaling 12,000,000 bbl or 40 percent of the 1983 reserve estimates for the area. These declines are due to the expected impact of declining prices, the federal injection law, and the Commonwealth's new oil and gas law on the heavily waterflooded Bradford field and adjacent areas. The 12,000,000 bbl had been added in 1983 to reflect the industry's expectations of higher prices and lower drilling costs. In 1984, however, prices declined and some drilling costs, especially for waterflood wells, increased. As a result, the anticipated reserves are now seen as unrealistic. Figure 3 shows statistics on crude oil reserves by shallow and deep reservoirs.

Figure 3. *Crude oil reserves in Pennsylvania, 1984.*

Reserves[1]	1984	[2]1983	% Change
Shallow oil[3]	56,954	69,334	-18
Deep oil[4]	905	776	+17
Total oil	57,859	70,110	-17

[1]In 1,000 barrels.
[2]Corrected figure.
[3]Shallow oil: from Late Devonian or younger rocks, generally less than 2,000 feet deep.
[4]Deep oil: from Lower Silurian Medina Group.

SECONDARY AND TERTIARY CRUDE OIL RECOVERY PROJECTS

A total of 46 service wells, including waterflood wells, gas-injection wells, tertiary recovery project wells, disposal wells, stratigraphic core test wells, and gas storage observation wells, was reported in 1984. Elk County had 24 service wells, and Venango County had 10 service wells. Other service wells were reported in Clarion, McKean, and Washing-

ton Counties. These 46 service wells represent a 41 percent decrease in oil-related services over 1983.

In a historical sense, the Bradford field in McKean County is the first field in which large-scale waterflooding technology was attempted. Flooding began in the field, probably by accident, sometime in the late 1800's, and intentional flooding began soon after. It was not until the early 1900's, however, that noticeable production enhancement became apparent. Since that time, most of the Bradford field has been under waterflood. Figure 4 shows the changes in oil production in Pennsylvania since Drake's well was drilled in 1859, and the changes in oil production in the Bradford field. It should be noted that in 1984 the Bradford field produced approximately 16 percent of the total state production.

Pennzoil Company operates two tertiary recovery projects, both of the microemulsion-polymer type, in the Bradford Third sand of the Bradford field. Special Project 7 was being selectively abandoned in 1984. Special Project 8 was in the polymer-solution injection stage at the end of the year with a resultant increase in oil production. This latter project, which includes 126 producing wells and 59 injection wells, comprises 220 acres of previously waterflooded Bradford Third sand.

NATURAL GAS PRODUCTION

Pennsylvania's natural gas production increased in 1984 by 41 percent, to 166,342 Mmcf (million cubic feet) from the 1983 total of 118,372 Mmcf. The number of producing gas wells increased 5 percent to an estimated 25,100. Figure 5 shows 1984 gas production statistics for Pennsylvania. Included is a general breakdown of gas production by shallow and deep reservoirs.

NATURAL GAS RESERVES

Proven recoverable reserves of natural gas in Pennsylvania increased 1 percent to 1,880,735 Mmcf in 1984. Stored recoverable gas increased 7

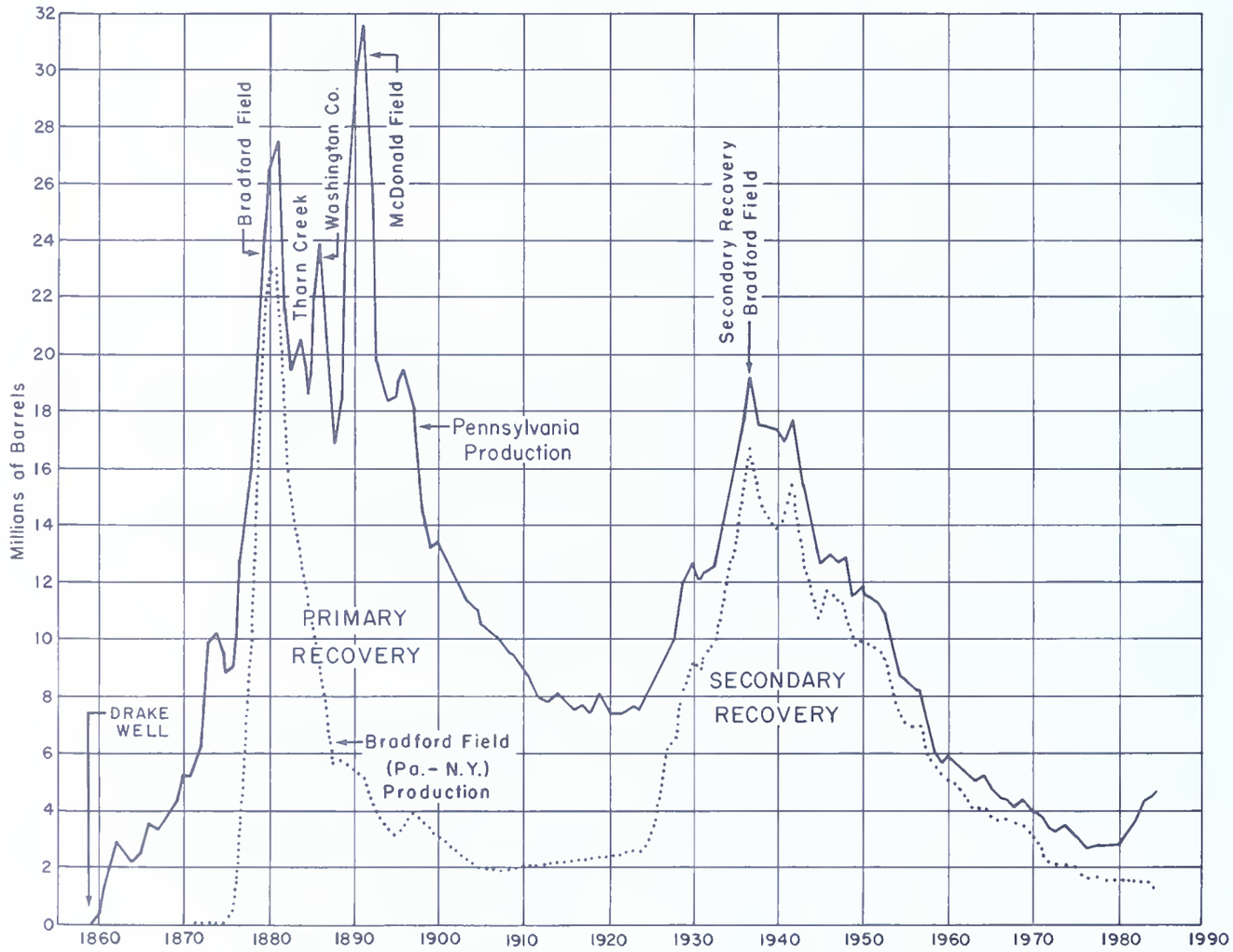


Figure 4. Annual production of crude oil in Pennsylvania, 1859–1984.

Figure 5. *Natural gas production in Pennsylvania, 1984.*

	[3]1984	[3]1983	% Change	Cumulative to 12/31/84[3]
Shallow gas[1]	133,258	90,449	+47	—
Deep gas[2]	33,084	27,923	+18	—
TOTAL GAS	166,342	118,372	+41	9,919,647

[1]Shallow gas: from Late Devonian or younger rocks; generally less than 4,000 feet deep.
[2]Deep gas: from Middle Devonian or older rocks; generally more than 4,000 feet deep.
[3]In millions of cubic feet.

percent as well, to 620,709 Mmcf. Figure 6 shows natural gas reserve figures for Pennsylvania in 1984, and Figure 7 graphically illustrates the differences among production, consumption, and reserves of natural gas for the last 38 years.

Figure 6. *Natural gas reserves in Pennsylvania, 1984.*

	[1]1984	[1]1983	% Change
Total gas	1,880,735	1,854,477	+1
Stored recoverable gas	620,709	581,193	+7

[1]In millions of cubic feet.

NATURAL GAS STORAGE AREAS

Since the early 1920's, Pennsylvania has consumed more natural gas than it has been able to produce. This has led to the necessity of storing natural gas in large quantities in the summer months to at least partially ensure an adequate supply during the winter. Storage reservoirs are typically old depleted gas-producing reservoirs, or bodies of rock whose geological and engineering characteristics would have made them ideal reservoirs had natural gas been emplaced in them. In Pennsylvania all of the major gas-producing horizons have been used at one time or another as storage reservoirs, but the most common reservoirs are Upper Devonian Bradford and Venango Group sandstones and fractured reservoirs in the Oriskany Sandstone. In Figure 8, the locations are shown and the names listed for all active gas storage areas in Pennsylvania in 1984. No changes in storage-area status were reported during the year. Recoverable gas in storage totaled 620,709 Mmcf in 1984 as compared with 581,193 Mmcf in 1983.

OIL AND GAS PRICES

The price for crude oil continued to decline early in 1984 following the trend set in mid-1981 after decontrol of oil allowed the market to reach its own level. Penn Grade crude oil sold for $28.00 per barrel on January 1, 1984, and dropped to $26.00 on August 1. This price was later rescinded and returned to $28.00. Crude oil lost $0.60 per barrel on October 1, and an additional $1.00 on November 14. Prices remained at $26.40 per barrel to the end of the year. Changes in crude oil pricing in 1984 are shown in Figure 9.

Natural gas prices have been subject to controls under the Natural Gas Policy Act (NGPA) since 1978. The pricing structure of the NGPA raised natural gas prices gradually over the last 6 years in order to provide operators with more realistic product prices. The expected cushion to the consumer against the shock of inevitable utility price hikes was less effective than expected, however. The lowest prices paid by utilities in Pennsylvania were for old gas, subject to old contracts, produced from pre-NGPA wells. Prices as low as $0.29 per Mcf (thousand cubic feet) are common in some of the older producing areas of the Commonwealth. The highest price allowed by NGPA was $5.90 per Mcf for Section 107 (High-Cost Gas, in this case the price paid for gas from "tight formations" such as the Lower Silurian Medina Group and certain Upper Devonian sandstones), and this was also the highest price paid. The average price for gas was approximately $3.25 per Mcf. Figure 10 shows NGPA price ceilings for natural gas during 1984.

DRILLING AND COMPLETION COSTS

The costs of drilling and completing a well, given below in dollars per foot, vary with the company, drilling depth, method of completion, and geographic area. Costs generally increase yearly due to inflation, but they may also increase as total depth increases, especially for wells that penetrate deeper, undrilled or untested formations. Dry holes are generally less expensive than producing wells because not as much is done to the hole outside of drilling and, perhaps, logging. Extremely deep wells may be extraordinarily expensive, not only because of increased rig time and increased casing, cementing, and other needs, but because provisions must be made for potential unforeseen problems. Wells drilled in untested formations and/or unexplored areas may require special testing and completion techniques as well. In Pennsylvania an average well would be drilled about 2,410 feet deep (the average total depth for all wells reported in 1984), probably to the Upper Devonian Venango or Bradford Group. As such, a deep well (Lower Devonian Ridgeley Formation or Lower Silurian Medina

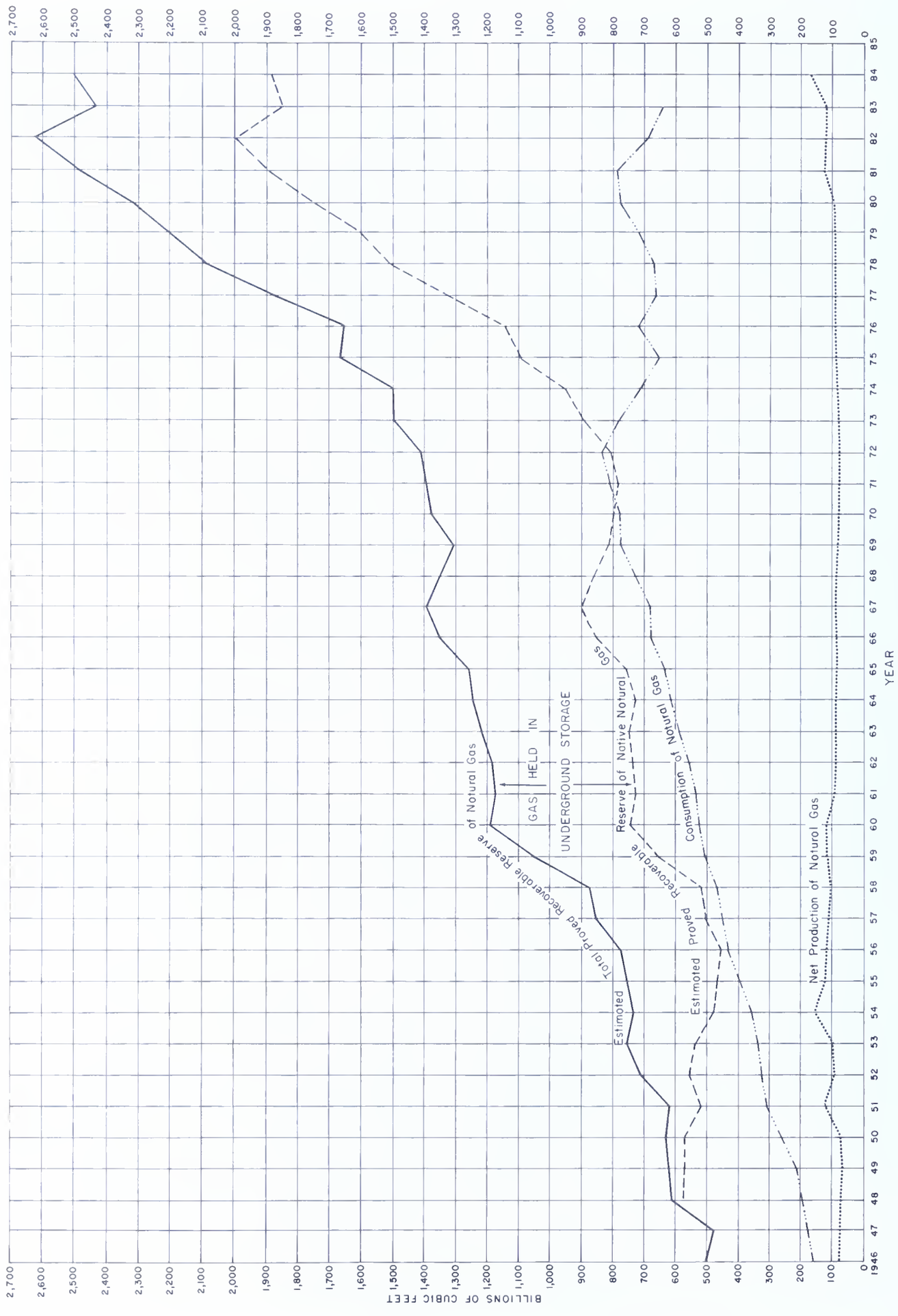


Figure 7. Production, consumption, and reserves of natural gas in Pennsylvania.

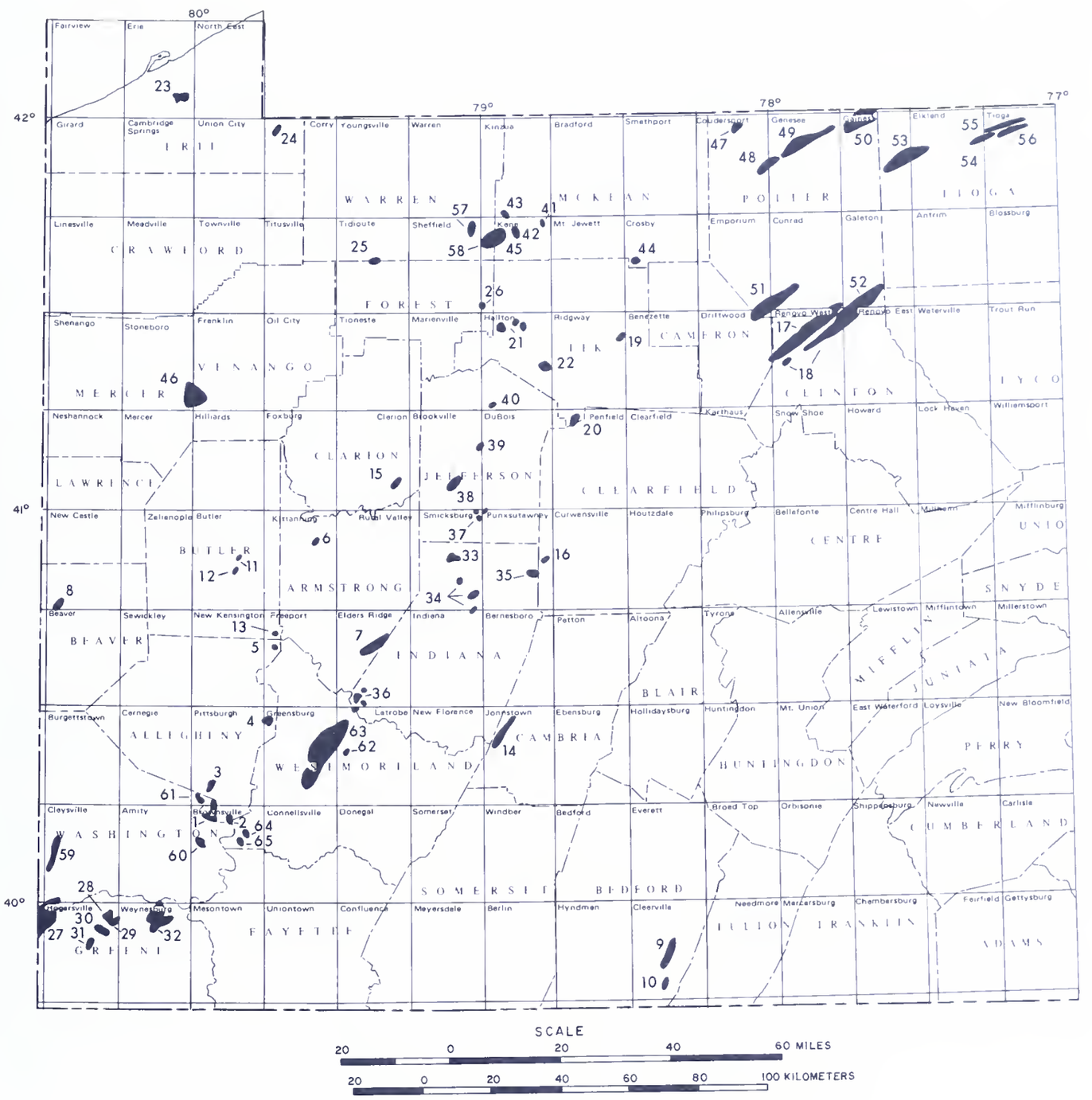


Figure 8. Active natural gas storage areas of Pennsylvania.

NAMES OF ACTIVE GAS STORAGE AREAS IN PENNSYLVANIA

ALLEGHENY COUNTY
1. Bunola
2. Gamble Hayden
3. Tepe
4. Murrysville (Dice)
5. Smith Parke

ARMSTRONG COUNTY
6. Fair and Helm
7. South Bend

BEAVER COUNTY
8. Black Hawk

BEDFORD COUNTY
9. Artemas A
10. Artemas B

BUTLER COUNTY
11. Vardy
12. Portman
13. Hughes

CAMBRIA COUNTY
14. Rager Mountain

CLARION COUNTY
15. Truittsburg

CLEARFIELD COUNTY
16. Gourley-Miller

CLINTON COUNTY
17. Leidy
18. Tamarack

ELK COUNTY
19. St. Marys
20. Boone Mountain
21. Owls Nest
22. Belmouth

ERIE COUNTY
23. Summit
24. Corry

FOREST COUNTY
25. Queen
26. Duhring

GREENE COUNTY
27. Majorsville-Heard
28. Swarts West
29. Swarts
30. Hunters Cave

NAMES OF ACTIVE GAS STORAGE AREAS IN PENNSYLVANIA *(Continued)*

GREENE COUNTY (Continued)
31. Holbrook
32. Pratt

INDIANA COUNTY
33. Alabran
34. Kinter
35. Clark
36. Schmidt

JEFFERSON COUNTY
37. Sprankle
38. Galbraith
39. Markle
40. Munderf

McKEAN COUNTY
41. Meade Run
42. Keelor
43. Swede Hill
44. Wellendorf
45. East Branch "B"

MERCER COUNTY
46. Henderson

POTTER COUNTY
47. Sharon
48. Hebron
49. Ellisburg
50. Harrison

POTTER COUNTY (Continued)
51. Wharton
52. Greenlick

TIOGA COUNTY
53. Sabinsville
54. Palmer
55. Tioga
56. Meeker

WARREN COUNTY
57. Deerlick
58. East Branch "A"

WASHINGTON COUNTY
59. Donegal
60. Colvin
61. Finleyville

WESTMORELAND COUNTY
62. Seanor
63. Oakford
64. Webster
65. Patton

Figure 9. *Crude oil prices in Pennsylvania, 1984.*

Month	*Price per barrel*
January 1, 1984	$28.00
August 1, 1984	[1]26.00
October 1, 1984	27.40
November 14, 1984	26.40

[1]Rescinded and returned to $28.00.

Group) is generally greater than 5,000 feet deep, and anything deeper than 10,000 feet is considered ultra deep.

Because drilling conditions and company policies vary widely, even within a small geographic area, the drilling costs listed below are only estimates and should not be used as anything more than "ballpark" figures for the industry in 1984.

1. Venango County, shallow oil well in the Venango Group sandstones, about 800 feet deep. Dry hole,* about $15 per foot. Completion, about $38 per foot.
2. Erie County, shallow gas well in Ohio Shale, about 900 feet deep. Completion, about $15 per foot.
3. Elk County, shallow oil well in the Bradford Group sandstones, about 2,400 feet deep. Dry hole,* about $13 per foot. Completion, about $24 per foot.
4. Greene County, shallow oil well in the Venango Group sandstones, about 2,800 feet deep. Dry hole,* about $23 per foot. Completion, about $79 per foot.
5. Indiana-Clearfield County area, shallow gas well in the Bradford Group sandstones, about 3,800 feet deep. Dry hole,* about $19 per foot. Completion, about $34 per foot.
6. Fayette-Westmoreland County area, shallow gas well in the Bradford Group sandstones, about 4,000 feet deep. Dry hole,* about $26 per foot. Completion, about $38 per foot.
7. Crawford-Mercer County area, deep gas well in the Medina Group sandstones, about 5,500 feet deep. Dry hole,* about $25 per foot. Completion, about $38 per foot.
8. Venango County, deep gas well in the Medina Group sandstones, about 5,600 feet deep. Dry hole,* about $22 per foot. Completion, about $38 per foot.
9. Westmoreland-Somerset County, deep gas well in the Ridgeley Sandstone, about 8,000 feet deep. Dry hole,* about $39 per foot. Completion, about $56 per foot.

*No completion attempted.

1984 DRILLING AND COMPLETIONS

TOTAL COMPLETIONS

A total of 2,598 wells was reported in Pennsylvania during 1984, reflecting a 2 percent increase in activity from the 1983 figure of 2,540 wells. This total includes 2,580 new wells and 18 old wells drilled deeper.

The total footage drilled in all reported wells increased 16 percent, to 6,238,255 feet. The average total depth in all wells drilled was 2,410 feet; this increase from last year's average of 2,123 is the result of the relative decrease in the number of shallow oil wells drilled, particularly in Venango County, where an average well is only about 800 feet deep. The 10 most active counties for drilling in 1984 were Venango, Erie, Warren, Indiana, Forest, Clearfield, McKean, Crawford, Cambria, and Westmoreland, in that order. Wells in those 10 counties represented 86 percent of all wells reported in the Commonwealth during the year (see Figure 11).

Figure 10. *Natural gas price ceilings under federal Natural Gas Policy Act in 1984.*

NGPA Section	Category of gas	Maximum lawful price for deliveries made in: Jan. 1984	Feb. 1984	Mar. 1984	Apr. 1984	May 1984	June 1984	July 1984	Aug. 1984	Sept. 1984	Oct. 1984	Nov. 1984	Dec. 1984
		cost per million British Thermal Units (in dollars)											
102	New, Natural Gas Certain OCS Gas	3.586	3.609	3.632	3.656	3.680	3.705	3.730	3.752	3.774	3.797	3.821	3.845
103	New, Onshore Production Wells	2.849	2.859	2.869	2.879	2.899	2.889	2.909	2.917	2.925	2.933	2.942	2.951
106(b)(1)(B)	Alternative Maximum Lawful Price for Certain Intrastate Rollover Gas	1.628	1.633	1.638	1.643	1.649	1.655	1.661	1.666	1.671	1.676	1.681	1.686
107(c)(5)	Gas Produced from Tight Formations	5.698	5.718	5.738	5.758	5.778	5.798	5.818	5.834	5.850	5.866	5.884	5.902
108	Stripper Gas	3.841	3.866	3.891	3.916	3.942	3.968	3.994	4.018	4.042	4.066	4.092	4.118
109	Not Otherwise Covered	2.359	2.367	2.375	2.383	2.391	2.399	2.407	2.414	2.421	2.428	2.436	2.444

Figure 11. *New well completions and old wells drilled deeper in Pennsylvania, 1984.*

NEW WELL COMPLETIONS

County	No. of wells	Average total depth (feet)
Allegheny	4	3,008
Armstrong	72	3,588
Beaver	12	1,493
Cambria	99	2,309
Centre	11	5,160
Clarion	72	1,711
Clearfield	168	3,661
Crawford	129	4,459
Elk	62	2,555
Erie	344	2,348
Fayette	10	4,259
Forest	191	1,364
Greene	4	5,279
Indiana	244	3,700
Jefferson	44	3,609
McKean	141	1,725
Mercer	36	5,349
Potter	16	1,334
Somerset	4	8,765
Tioga	2	6,676
Venango	586	1,047
Warren	245	2,205
Washington	8	4,169
Westmoreland	76	3,760
TOTAL	2,580	2,410

OLD WELLS DRILLED DEEPER

County	No. of wells	Average total depth (feet)
Armstrong	3	1,804
Clarion	1	772
Clearfield	1	3,148
Erie	2	910
Fayette	1	1,570
Indiana	1	6
Jefferson	6	1,216
McKean	1	413
Venango	1	250
Washington	1	340
TOTAL	18	1,118

OIL COMPLETIONS

Pennsylvania's oil industry reported 1,073 oil well completions during 1984, including 2 old wells drilled deeper. This represents a 25 percent decrease over 1983. Total footage drilled in all oil wells was 1,235,876 feet, a 21 percent decrease over a year ago. The average total depth for all oil wells was 1,153 feet. The most active counties for oil well drilling were Venango, Warren, Forest, and McKean, in order of importance. Drilling in these four counties accounted for 92 percent of all oil wells reported in the Commonwealth in 1984 (Figure 12).

Figure 12. *New oil well completions and old wells drilled deeper in Pennsylvania, 1984.*

NEW OIL WELL COMPLETIONS

County	No. of wells	Average initial production (bopd)[1]	Average total depth (feet)
Beaver	11	5	1,519
Clarion	31	2	1,169
Crawford	1	3	812
Elk	25	[2]	2,485
Forest	167	11	1,272
McKean	121	2	1,712
Potter	15	2	1,319
Venango	529	6	868
Warren	169	21	1,259
Washington	1	2	4,607
Westmoreland	1	15	3,324
TOTAL	1,071	9	1,153

OLD OIL WELLS DRILLED DEEPER

County	No. of wells	Average initial production (bopd)[1]	Average amount deepened (feet)
McKean	1	[2]	413
Venango	1	[2]	250
TOTAL	2	Not reported	332

[1]bopd=barrels of oil per day.
[2]Initial production not reported.

GAS COMPLETIONS

Pennsylvania's natural gas industry reported 1,379 gas well completions in 1984, including 15 old wells drilled deeper. This figure constitutes a 48 percent increase over the 1983 figure of 930 wells. The total footage drilled in all gas wells was 4,680,059 feet, a 34 percent increase from the previous year. The average depth for new gas wells was 3,417 feet. The most active counties for gas well drilling were Erie, Indiana, Clearfield, Crawford, and Cambria, accounting for 71 percent of all gas wells reported during the year. These data are summarized in Figure 13.

COMBINATION OIL AND GAS WELL COMPLETIONS

(Not Reported Separately as Oil or Gas)

The Bureau of Topographic and Geologic Survey classifies any well that is primarily an oil well (i.e.,

Figure 13. *New gas well completions and old wells drilled deeper in Pennsylvania, 1984.*

NEW GAS WELL COMPLETIONS

County	No. of wells	Average initial open flow (Mcfgpd)[1]	Average total depth (feet)
Allegheny	2	102	3,636
Armstrong	71	494	3,589
Beaver	1	10	1,215
Cambria	99	862	2,309
Centre	11	1,157	5,160
Clarion	29	158	2,495
Clearfield	168	1,033	3,661
Crawford	122	509	4,526
Elk	11	70	2,437
Erie	342	935	2,343
Fayette	4	199	5,620
Forest	10	128	1,981
Greene	4	870	5,279
Indiana	242	671	3,700
Jefferson	43	705	3,619
McKean	4	252	1,862
Mercer	33	1,062	5,321
Potter	1	11	1,556
Somerset	2	2,946	8,899
Venango	21	1,334	5,321
Warren	66	1,633	4,768
Washington	5	442	4,474
Westmoreland	73	796	3,817
TOTAL	1,364	829	3,417

OLD GAS WELLS DRILLED DEEPER

County	No. of wells	Average initial open flow (Mcfgpd)[1]	Average amount deepened (feet)
Armstrong	3	299	1,804
Clarion	1	NC[2]	772
Clearfield	1	2,936	3,148
Erie	2	8	910
Fayette	1	102	1,570
Indiana	1	143	6
Jefferson	5	181	1,448
Washington	1	100	340
TOTAL	15	339	1,293

[1]Mcfgpd=thousand cubic feet of gas per day.
[2]NC=noncommercial.

produces any amount of oil) but also produces at least 50 Mcfgpd (thousand cubic feet of gas per day) as a combination oil and gas well. Most oil wells drilled in the Commonwealth produce a little gas, and many produce enough gas to be sold to utilities or pipeline companies. However, if the well produces less than 50 Mcfgpd, regardless of whether or not the gas is sold, it is considered simply as an oil well. Pennsylvania's oil and gas operators reported 40 new combination wells in 1984, a 25 percent increase over the 1983 total of 32. Total footage for these 40 wells was 87,395 feet, a 25 percent increase from a year ago. The average depth for the 40 wells was 2,185 feet. Twenty-three of these wells, or 58 percent, were drilled in Forest and McKean Counties (Figure 14).

Figure 14. *New combination oil and gas well completions in Pennsylvania, 1984.*

County	No. of wells	Average initial production (bopd)[1]	Average initial open flow (Mcfgpd)[2]	Average total depth (feet)
Crawford	6	[3]	869	3,714
Forest	12	15	124	1,992
McKean	11	[3]	103	1,854
Mercer	1	[3]	750	5,080
Venango	1	[3]	72	1,015
Warren	8	[3]	133	1,429
Westmoreland	1	20	250	3,295
TOTAL	40	5	249	2,185

[1]bopd=barrels of oil per day.
[2]Mcfgpd=thousand cubic feet of gas per day.
[3]Initial production not reported.

DRY COMPLETIONS

A total of 60 dry holes was reported in Pennsylvania in 1984, including one old well drilled deeper. These wells represent a 5 percent decrease in the

Figure 15. *New dry hole completions and old well drilled deeper but completed dry in Pennsylvania, 1984.*

NEW DRY HOLE COMPLETIONS

County	No. of dry holes	Average total depth (feet)
Allegheny	2	2,381
Armstrong	1	3,594
Clarion	4	1,365
Elk	2	4,874
Erie	2	3,171
Fayette	6	3,353
Forest	2	2,143
Indiana	2	3,748
Jefferson	1	3,230
McKean	2	1,950
Mercer	2	5,948
Somerset	2	8,631
Tioga	2	6,676
Venango	25	1,333
Warren	2	661
Washington	1	3,316
Westmoreland	1	539
TOTAL	59	2,541

OLD WELL DRILLED DEEPER BUT COMPLETED DRY

County	No. of dry holes	Average amount deepened (feet)
Jefferson	1	54

number of dry holes from the 1983 total of 63. The success rate for all drilling was 98 percent. The total footage for dry holes in 1984 was 150,001 feet, a 17 percent increase. The average total depth for all dry holes was 2,541 feet (Figure 15).

SERVICE WELLS

Service wells include all oil- and gas-related wells that cannot specifically be considered oil- and gas-producing wells or dry holes. These wells comprise several types: stratigraphic core tests, drilled to collect subsurface information such as formation thickness or the effects of well completion on various rock types; water-supply wells for waterflood projects; fluid-injection wells for secondary and tertiary recovery of oil; liquid-waste disposal wells; and gas storage observation wells. Increases and decreases within this category do not accurately reflect oil and gas drilling trends because, for instance, an oil field operator may drill all of his water-supply wells and fluid-injection wells several years after the oil-producing wells have been completed.

During 1984, 46 service wells were reported in Pennsylvania. This is a 41 percent decrease (78 wells) from 1983. Most of the service wells reported during the year were injection wells for secondary or tertiary oil recovery projects. The total footage drilled in these 46 wells was 84,924 feet, a 41 percent decrease from the footage drilled in 1983. The average total depth for all service wells was 1,846 feet. Drilling in Elk and Venango Counties accounted for 75 percent of all service wells reported in 1984 (see Figure 16).

Figure 16. *New service well completions in Pennsylvania, 1984.*

NEW SERVICE WELL COMPLETIONS

County	*No. of wells*	*Average total depth (feet)*
Clarion	8	1,151
Elk	24	2,490
McKean	3	1,471
Venango	10	849
Washington	1	3,061
TOTAL	46	1,846

DRILLING AND PRODUCTION ACTIVITY

(Classified as Shallow or Deep)

The Oil and Gas Geology Division of the Bureau of Topographic and Geologic Survey classifies oil and gas wells as shallow or deep, not depending on depth, but on whether or not the Upper-Middle Devonian boundary was penetrated in the well. Wells that penetrate the boundary (normally the top of the Tully Limestone, but may be an equivalent shale) are considered deep. Wells that do not penetrate the boundary are considered shallow, regardless of depth. Because of the wedge-shaped character of the sedimentary package deposited in the Appalachian basin, absolute drilling depth is not instrumental. A Lower Silurian Medina Group well in Erie County along the lake shore may be only 2,500 feet deep, and an Upper Devonian Bradford Group well in Clearfield County may be as much as 4,000 feet deep. Yet, the Medina well is considered deep and the Bradford well is considered shallow on the basis of geologic age. Shallow wells, which account for the greatest number of wells drilled in Pennsylvania, may produce oil or gas; deep wells most commonly produce gas, but there are some wells in Erie and Crawford Counties that produce small amounts of oil as well. Figure 17 illustrates shallow-well drilling activity in Pennsylvania over the last 34 years, and Figure 18 shows the changes in deep well activity during the period 1930–84.

The number of shallow wells reported in Pennsylvania in 1984 increased by 1 percent from 2,150 in 1983 to 2,177 in 1984, including 2,114 new wells, 17 oil wells deepened, and 46 new service wells. In general, the shallow oil wells were drilled to the Venango Group and the shallow gas wells were drilled to the Bradford Group. Subsidiary drilling in other shallow horizons found production in the Mississippian, in the Upper Devonian Brallier, Harrell, and Lock Haven Formations, and in the Upper and Middle Devonian shales. Shallow oil and/or gas well drilling in Venango, Indiana, Forest, Erie, Warren, Clearfield, and McKean Counties accounted for 77 percent of all shallow drilling reported in 1984.

Deep drilling in Pennsylvania also increased slightly in 1984. During the year 421 deep wells were reported in the Commonwealth, an increase of 8 percent over the 1983 figure of 390. Drilling to the Lower Silurian Medina Group in Erie, Crawford, Warren, Mercer, and Venango Counties dominated deep drilling, accounting for 97 percent of all deep-well activity.

Figure 19 shows the statistical breakdown for both shallow and deep wells reported in Pennsylvania in 1984. Figure 20 illustrates shallow and deep

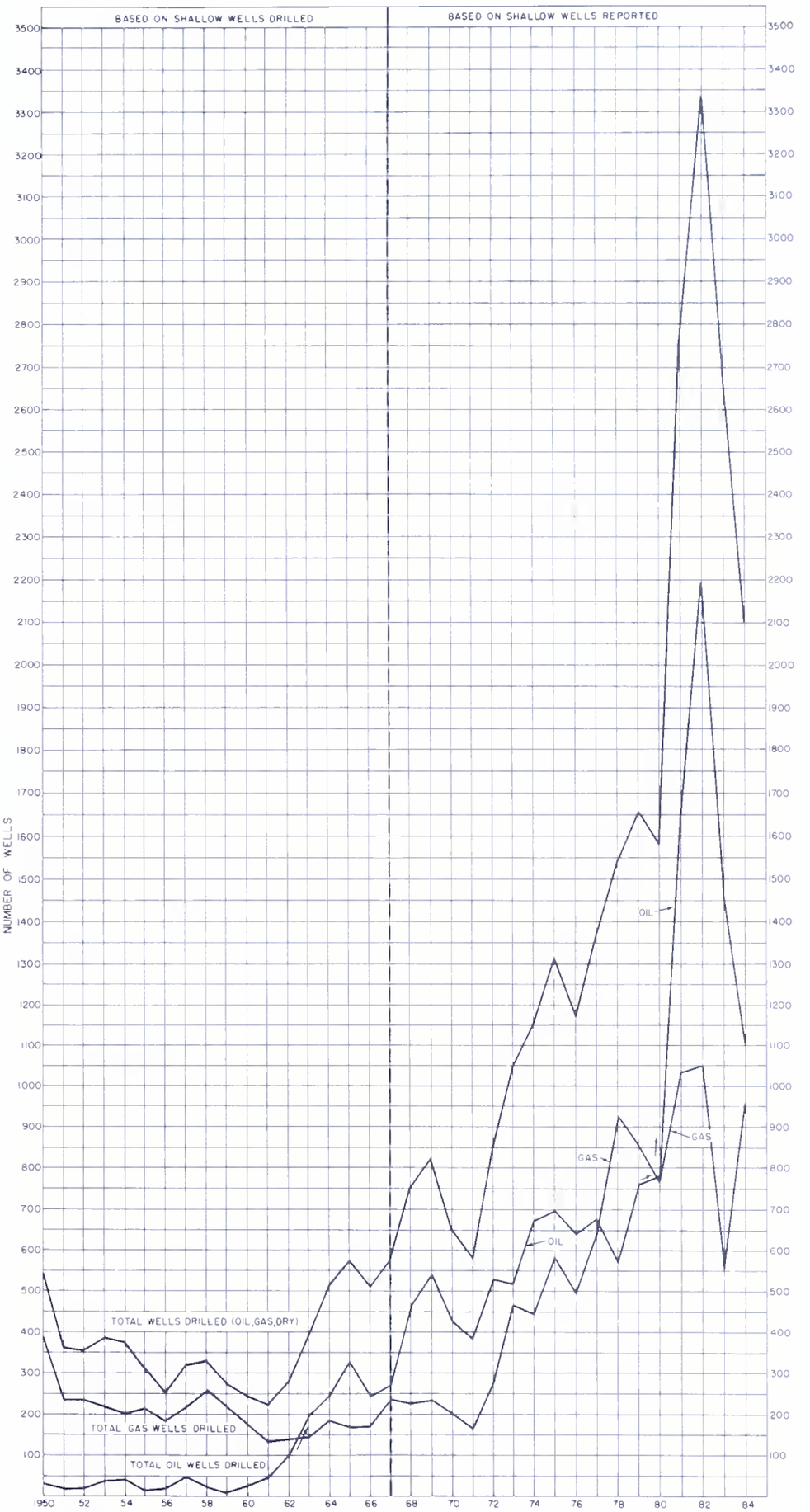


Figure 17. Shallow well activity, 1950–84 (Late Devonian or younger producing horizons; generally less than 4,000 feet).

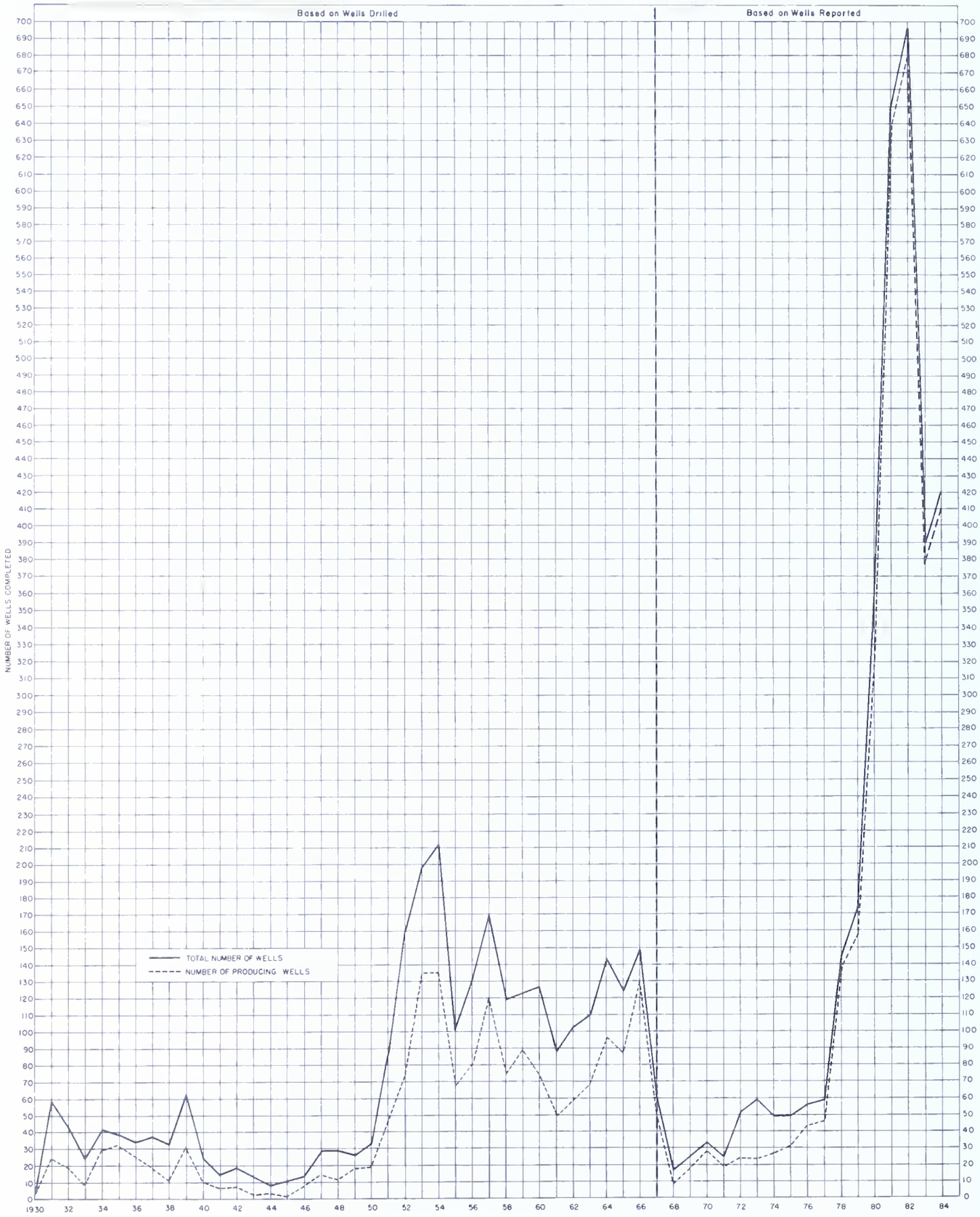


Figure 18. Annual rate of deep formation exploration and development, 1930–84 (Middle Devonian or older producing horizons; generally more than 4,000 feet).

Figure 19. *Drilling and completion of wells reported, 1984 (according to geologic age and depth of producing horizons).*

Shallow—Upper Devonian and younger	
NEW WELLS	
Gas	962
Oil	1,071
Oil and gas	33
Dry	48
Total	2,114
DEEPENED WELLS	
Gas	14
Oil	2
Dry	1
Total	17
MISCELLANEOUS WELLS	
Service	46
Total shallow wells	2,177
Deep—Middle Devonian and older	
NEW WELLS	
Gas	402
Oil and gas	7
Dry	11
Total	420
DEEPENED WELLS	
Gas	1
Total deep wells	421
TOTAL ALL WELLS DRILLED	2,598

well drilling in terms of the final reported producing formations.

Shallow production totaled 133,258 Mcf of gas and 4,703,990 bbl of oil, whereas deep production accounted for 33,084 Mcf of gas and 120,976 bbl of oil. Figure 21 shows deep gas production during the year by field and pool. The information in Figure 21 is summarized in Figure 22, which shows amounts of gas produced from the various deep reservoirs, both as an annual total and as cumulative totals. Figure 23 illustrates the amount of production, the yearly average unit price, and yearly total values for oil and gas produced in Pennsylvania since 1960.

PENNSYLVANIA DRILLING AND PRODUCTION RECORDS

The drilling depth record for Pennsylvania was set at 21,460 feet by the Amoco Production Company #1 Svetz well in Somerset County in 1975. This is also the deepest well drilled in the Appalachian basin. The deepest producing depth in Pennsylvania is 13,030 feet in the Texaco U.S.A. #1 Commonwealth of Pennsylvania Tract 285. Production in this well is from the Bald Eagle Formation (Upper Ordovician) in the Grugan field, Clinton County. The record for largest initial production of gas for both Pennsylvania and the Appalachian basin is held by the New York State Natural Gas #1 Finnefrock

Figure 20. *Oil and gas well completions in Pennsylvania by shallow and deep producing formations, 1984.*

		Producing formation	*Oil wells*	*Gas wells*	*Combination oil and gas wells*
SHALLOW	Commingled	General Mississippian	0	7	0
	Commingled		0	6	0
	Commingled	Venango Group	652	14	1
	Commingled		0	260	1
	Commingled	Bradford Group	421	488	31
	Commingled		0	1	0
	Commingled	Elk Group	0	0	0
		Lock Haven Formation	0	10	0
		Brallier Formation	0	2	0
		Devonian black shales[1]	0	192	0
DEEP		Onondaga Group[2]	0	1	0
		Ridgeley Sandstone	0	4	0
		Bois Blanc-Salina interval	0	5	0
		Medina Group	0	389	7
		Total	1,073	1,379	40

[1]Includes wells drilled to deep formations, but completed as shallow producers.

[2]Includes Huntersville Chert and Onondaga limestone complex.

Figure 21. *Gas production from rocks of Middle Devonian or older age in Pennsylvania, 1984 (classified as "deep" production).*

County	*Field*	*Pool*	*Discovery date*	*Cumulative production at end of 1983 (Mcf)*[1]	*Production 1984 (Mcf)*[1]	*Cumulative production at end of 1984 (Mcf)*[1]	*Status of field or pool at end of 1984*[2]	*Reservoir*[3]
Allegheny	Forward	Monongahela	3/25/79	18,000	11,000	29,000	Prod.	MS
Armstrong	Goheenville	Snyderville	10/23/70	301,638	12,393	314,031	Prod.	O
	Roaring Run	Roaring Run Oriskany	12/14/70	7,304,985	237,968	7,542,953	Prod. and SI	O
Bedford	Five Forks	Weimer Run	11/ 1/82	0	0	0	SI	O
Cambria	Carrolltown	Burley	1/13/69	354,066	15,888	369,954	Prod.	O
		Pindleton	6/30/69	5,203,842	127,161	5,331,003	Prod. and SI	O
	Pot Ridge		7/ 1/81	0	0	0	SI	O
Cameron	East Emporium		11/18/71	5,151,389	207,158	5,358,547	Prod.	O
Cameron and Elk	Hicks Run		6/ 7/56	4,361,933	11,132	4,373,065	Prod. and SI	O
	Whippoorwill		7/10/61	16,136,166	141,957	16,278,123	Prod. and SI	O
Cameron, Clearfield, Elk, Indiana, and Jefferson	Punxsutawney-Driftwood	*TOTAL*	*9/15/51*	*382,856,018*	*844,336*	*383,700,354*	*Prod., SI, and aban.*	O
		Benezette	1/ 5/53	251,137,621	219,615	251,540,496	Prod., SI, and aban.	O
		Driftwood	9/15/51		183,260			
		Grove Hill	2/18/81	10,229	1,488	11,717	Prod.	O
		Helvetia	5/11/60	131,708,168	46,365	132,148,141	Prod., SI, and aban.	O
		Rockton	2/25/55		387,333			
	Big Run	Reed-Deemer	12/ 1/53		6,275			
Centre	Black Moshannon		3/31/82	0	0	0	SI	M
	Devils Elbow		12/18/77	2,134,044	237,962	2,372,006	Prod. and SI	T
	Runville		2/28/80	264,905	106,129	371,034	Prod.	T
Clarion	Clarion-Miola	Weaver	2/22/80	0	0	0	SI	O
Clearfield	Boone Mountain	Moshannon	9/15/76	50,055	3,409	53,464	Prod.	O
	Gifford Run		1/13/83	0	235,903	235,903	Prod.	O
	Irish Run	Anderson Creek	9/25/75	67,445	16,351	83,796	Prod. and SI	O
	West Decatur		3/30/73	3,764,251	0	3,764,251	SI	O
		Eagle Eye	12/ 6/81	0	649,578	649,578	Prod.	O
Clearfield, Elk, and Jefferson	Penfield	DuBois	1/ 6/60	106, 139,337	99,825	106,239,162	Prod. and SI	O
		Sabula	8/26/63	1,298,233	75,082	1,373,315	Prod. and SI	O
Clinton	Grugan		8/12/82	312,100	726,373	1,038,473	Prod.	BE
Clinton and Potter	Leidy	*TOTAL*	*1/ 8/50*	*160,400,544*	*15,802*	*160,416,346*	*Prod., gas stor., and SI*	O
		Ole Bull	1/ 9/59	5,600,512	15,802	5,616,314		
Crawford	Athens	*TOTAL*	*9/20/74*	*4,904,217*	*1,358,608*	*6,262,825*	*Prod. and SI*	M
		Brimstone	1/30/79	2,397,000	384,068	2,781,068	Prod. and SI	M
		Dutch Hill	8/31/80	701,791	257,568	959,359	Prod.	M
		Lincolnville	8/16/80	165,047	64,477	229,524	Prod.	M
		Potash Run	3/18/79	242,143	45,091	287,234	Prod.	M
		Rome	6/ 9/79	415,852	440,295	856,147	Prod.	M

		Steuben	12/22/79	0	0	0	SI	M
	Atlantic	Adamsville	8/ 5/81	0	0	0	SI	M
	Blooming Valley		8/ 5/81	53,077	36,867	89,944	Prod.	M
	Cambridge Springs		1/31/76	383,717	[4]135,430	519,147	Prod. and SI	M
		Cambridge	4/ 6/76	27,503	24,694	52,197	Prod.	M
	Church Run	Hatchtown	6/27/79	117,431	144,719	262,150	Prod.	M
		Vrooman	12/ 7/79	422,826	394,060	816,886	Prod.	M
	Conneaut Lake		8/ 9/82	0	31,221	31,221	Prod. and SI	M
	Eaton Corners	Brown Hill	11/15/81	125,454	[4]144,272	269,726	Prod.	M
	Frenchtown		8/17/80	19,611	7,444	27,055	Prod. and SI	M
		Guy Mills	8/26/80	0	0	0	SI	M
		Mt. Hope	10/31/80	0	0	0	SI	M
	Geneva	Greenwood	10/31/73	213,453	35,863	249,316	Prod.	M
		Rock Creek	6/27/77	465,158	93,938	559,096	Prod.	M
	Meadville	Tamarack Lake	12/12/80	0	0	0	SI	M
	Papenfuse		11/16/80	136,657	44,529	181,186	Prod. and SI	M
	Randolph	Delamater	9/11/81	0	1,075	1,075	SI	M
	Richmond Township	Woodcock	7/21/81	0	29,395	29,395	Prod.	M
		Zirkle	6/22/81	0	0	0	SI	M
	Rockdale		11/30/79	688,200	[4]460,000	1,148,200	Prod., SI, and aban.	M
	South Shenango		8/ 9/79	0	0	0	SI	M
		Espyville	2/ 8/81	0	0	0	SI	M
	Sparta	Eastman Hill	10/30/75	0	NA	0	Prod.	M
	Vernon	Keborts	8/14/81	0	0	0	SI	M
Crawford and Erie	Conneaut	*TOTAL*	*2/11/57*	*49,570,742*	*3,962,084*	*53,532,826*	*Prod., SI, and aban.*	M
		Beaver Creek	9/26/81	4,262	13,892	18,154	Prod.	M
		Blood	12/17/80	0	112,416	112,416	Prod.	M
		Bushnell-Lexington	12/31/58	18,814,815	380,711	19,195,526	Prod., SI, and aban.	M
		Carlson	2/23/81	0	274,334	274,334	Prod. and SI	M
		Center Bar	11/19/78	4,074	1,669	5,743	Prod.	M
		Cranesville	6/17/81	2,630	0	2,630	SI	L
		Forro	1/ 4/58	28,284	0	28,284	SI	M
		Indian Springs	9/11/57	17,665,491	1,591,534	19,257,025	Prod., SI, and aban.	M
		Kastle	7/14/62	2,146,864	404,624	2,551,488	Prod. and SI	M
		Lundys Lane	11/ 9/61	5,665,396	[4]607,174	6,272,570	Prod., SI, and aban.	M
		Marsh Run	5/20/82	858	NA	858	Prod.	H
		Mud Run	11/ 5/81	25,460	20,067	45,527	Prod.	M
		Pageville	10/10/80	298,260	173,612	471,872	Prod. and SI	M
		Pennside	2/ 8/81	13,778	40,177	53,955	Prod.	M
		Pierce	12/31/58	933,540	11,202	944,742	Prod.	M
		Rogers	4/ 8/82	0	12,274	12,274	Prod.	O
		Springboro	11/ 7/79	202,789	53,864	256,653	Prod. and SI	M
		Stone Run	10/21/79	150,765	240,526	391,291	Prod. and SI	M
		West Mead	7/ 8/74	17,992	24,008	42,000	Prod.	M
	Cussewago		6/17/81	46,524	[4]91,375	137,899	Prod. and SI	M

Figure 21. *(Continued)*

County	*Field*	*Pool*	*Discovery date*	*Cumulative production at end of 1983 (Mcf)*[1]	*Production 1984 (Mcf)*[1]	*Cumulative production at end of 1984 (Mcf)*[1]	*Status of field or pool at end of 1984*[2]	*Reservoir*[3]
Crawford and Mercer	Jamestown		1/18/79	50,312	8,150	58,462	Prod. and SI	M
	Kantz Corners	*TOTAL*	*7/26/77*	*10,088,239*	*3,305,050*	*13,393,289*	*Prod. and SI*	M
		Barco	12/13/80	23,024	7,369	30,393	Prod.	M
		East Fairfield	7/31/80	521,378	188,798	710,176	Prod.	M
		Mt. Pleasant Road	8/30/80	81,313	25,001	106,314	Prod.	M
		Round Knob	11/12/80	472,503	174,979	647,482	Prod.	M
		Shaws Corners	7/15/80	894,430	316,475	1,210,905	Prod.	M
Crawford, Mercer, and Venango	Cochranton		11/16/80	2,216,583	1,363,368	3,579,951	Prod. and SI	M
		Deckard	11/ 4/80	340,427	130,120	470,547	Prod.	M
		McDaniels	3/16/81	506,241	180,225	686,466	Prod.	M
Crawford and Warren	County Line		1/31/81	188,203	190,714	378,917	Prod. and SI	M
Elk	Horton	Boot Jack	9/20/73	11,275	0	11,275	SI	H
Erie	Alder Run		8/24/74	19,562	104,146	123,708	Prod.	M
	Carter Hill		5/14/79	115,476	143,214	258,690	Prod.	M
	Columbus	Hare Creek	6/26/81	26,209	23,946	50,155	Prod.	M
	Concord	Harbor Ridge	10/ 2/79	4,106	[4]2,000	6,106	Prod.	M
		Stewart Road	3/10/80	0	0	0	SI	M
	Corry	*TOTAL*	*4/29/47*	*1,254,933*	*198,083*	*1,453,016*	*Prod., SI, aban., and gas stor.*	M
		Beaver Dam	5/20/53	263,145	[4]63,779	326,924	Prod. and SI	M
		Spencer Creek	6/19/70	10,710	[4]33,463	44,173	Prod., SI, and aban.	M
		Tarbell	9/12/80	27,682	[4]10,100	37,782	Prod.	M
	Drumlin	Greenley	10/11/83	0	[4]45,598	45,598	Prod.	H
		Swails	6/27/80	1,004,710	1,042,936	2,047,646	Prod. and SI	M
	Edinboro		7/28/80	483,505	[4]357,566	841,071	Prod.	M
	Edinboro North		1/ 9/80	1,974,954	[4]884,234	2,859,188	Prod. and SI	M
		Conneauttee	10/14/82	2,631	8,235	10,866	Prod.	S
	Erie	Bartosik	3/ 7/79	96,324	1,736	98,060	Prod.	O
		Brandy Run	5/28/79	118	0	118	SI	M
		Charter Oaks	5/19/77	161,840	38,335	200,175	Prod. and SI	M
		Dunn Valley	1/19/80	18,923	2,666	21,589	Prod.	M
		Fairplain	6/ 5/79	677	0	677	Noncommercial	M
		Fairview	3/12/76	6,314	804	7,118	Prod. and SI	M
		Glenwood	8/ 9/77	111,286	21,787	133,073	Prod.	M
		Goddard	8/31/78	112,307	31,185	143,492	Prod. and SI	M
		Heidler	5/22/79	0	0	0	Noncommercial	M
		Lawrence Park	8/30/77	15,160	5,178	20,338	Prod. and SI	M

		McKean	1/19/73	136,679	0	136,679	SI	O
		Talcott	7/ 8/79	405,690	300,095	705,785	Prod. and SI	M
	Franklin Center		6/16/80	283,443	273,375	556,818	Prod. and SI	M
	LeBoeuf	Waterford	3/21/77	3,064,739	1,482,142	4,546,881	Prod. and SI	M
	Mill Village		7/27/79	3,007,905	1,174,370	4,182,275	Prod.	M
	New Ireland		5/14/78	580,031	[4]338,542	918,573	Prod.	M
		Pattison	11/ 9/79	193,533	[4]35,539	229,072	Prod. and SI	M
	North East	Bailey Brook	1/11/80	35,551	3,428	38,979	Prod. and SI	M
		Bull Reservoir	9/17/60	660,490	275,798	936,288	Prod. and SI	M
		Burgess	10/17/60	2,667,767	249,217	2,916,984	Prod.	M
		Delhill Corners	6/23/79	3,062	4,960	8,022	Prod. and SI	N
		Half Moon	9/ 6/79	0	1,437	1,437	Prod.	M
		Harborcreek	10/20/77	1,017,823	79,461	1,097,284	Prod.	M
		Hornby	6/10/78	1,234,421	359,088	1,594,309	Prod. and SI	M
		Kuhl	8/14/78	32,728	[4]9,970	42,698	Prod. and SI	M
		Little Hope	12/ 7/78	22,159	38,696	60,855	Prod.	M
		McGuire	2/ 8/80	0	0	0	SI	O
		Orchard Beach	2/18/74	2,778,526	233,255	3,011,781	Prod.	M
		Wattsburg	4/19/80	27	0	27	SI	M
	Phillipsville	Dennee	7/14/81	24,480	15,598	40,078	Prod.	M
	Reeds Corners		7/ 9/80	419,820	156,611	576,431	Prod. and SI	M
Erie and Warren	Brokenstraw		7/27/78	46,413	[4]48,492	94,905	Prod. and SI	M
		Stroup	7/28/80	8,142	15,537	23,679	Prod.	M
	Union City	Bentley Run	10/13/80	17,820	[4]10,429	28,249	Prod.	M
		Emmons	12/30/80	25,132	[4]39,003	64,135	Prod.	M
Fayette	Feik		8/ 8/63	17,887	4,276	22,163	Prod.	O
	Mill Run		8/17/78	0	0	0	SI	O
	Sandy Creek	Quebec Run	6/ 3/69	28,205	3,551	31,756	Prod.	O
	Spruell		10/13/61	8,016,147	193,488	8,209,635	Prod.	O
	Summit	North Summit	3/24/38	21,822,645	43,316	21,865,961	Prod.	O
		South Summit	5/ 9/42	22,910,541	55,342	22,965,883	Prod. and SI	O
Fayette and Somerset	Ohiopyle[5]		12/28/59	4,577,265	45,526	4,622,791	Prod., SI, and aban.	O
Fayette and Westmoreland	Jacobs Creek	Bailey	12/26/61	2,330,752	46,591	2,377,343	Prod. and SI	O
Indiana	Cherry Hill	Crichton	1/ 9/63	3,306,722	7,208	3,339,910	Prod.	O
		Hadden	7/11/63		25,980			
	Commodore	Wandin	5/12/81	167,783	181,382	349,165	Prod.	O
	Jacksonville	Jacksonville Deep	11/17/56	30,498,611	117,361	30,615,972	Prod. and SI	O
	Lewisville	Serro	5/21/83	17,144	53,236	70,380	Prod.	N
	Living Waters	Uniontown	2/21/80	426,167	197,390	623,557	Prod.	O
	Nolo	Carney Run	4/28/80	0	0	0	SI	O
		Nolo Deep	9/30/56	14,000,542	32,339	14,032,881	Prod. and SI	O
	Strongstown	Lizowitz	6/19/54	11,256,227	649,392	11,905,619	Prod. and SI	O
		Pineton	12/20/69	12,410,652	691,410	13,102,062	Prod. and SI	O
Jefferson	Frostburg	Elk Run	6/30/65	49,197,381	260,190	49,457,571	Prod. and SI	O
Lawrence	Neshannock Creek		12/14/79	0	0	0	SI	MS
Lycoming	Salladasburg		6/24/76	36,123	0	36,123	SI	O

Figure 21. *(Continued)*

County	*Field*	*Pool*	*Discovery date*	*Cumulative production at end of 1983 (Mcf)*[1]	*Production 1984 (Mcf)*[1]	*Cumulative production at end of 1984 (Mcf)*[1]	*Status of field or pool at end of 1984*[2]	*Reservoir*[3]
McKean	Bradford	Cyclone	2/18/74	1,495,003	111,973	1,606,976	Prod.	N
		Minard Run	1/10/75	13,200	2,000	15,200	Prod.	C
	Corydon		9/ 8/72	30,705	NA	13,705		O
Mercer	Coolspring	Filer Corners	8/ 8/83	0	0	0	SI	M
	Greenfield		5/17/84	0	3,298	3,298	Prod.	M
	Greenville	Thiel	10/28/81	8,079	0	8,079	SI	M
	Hadley	Derber	9/13/81	154,830	NA	154,830	Prod.	O
		Perry School	8/30/81	41,087	14,281	55,368	Prod.	M
	Maysville		11/11/77	23,661	[4]2,278	25,939	Prod.	M
		West Salem	2/17/81	12,425	[4]2,230	14,655	Prod.	M
	New Hamburg	Good Hope	2/ 2/79	29,613	0	29,613	SI	M
	Sandy Lake	Carpenter Corners	9/11/82	0	0	0	SI	M
		New Lebanon	1/27/83	0	0	0	SI	M
	Sharon	Sharon Deep	2/26/78	845,851	216,418	1,062,269	Prod. and SI	M
	Sheakleyville		5/12/81	355,103	148,899	504,002	Prod.	M
		Osborn	9/ 6/81	156,646	181,290	337,936	Prod.	M
	Stoneboro	Lake	3/ 2/83	0	0	0	SI	M
	Volant	Ligo	2/26/82	2,823	25,283	28,106	SI	M
		Pardoe	7/24/81	3,623	3,015	6,638	Prod. and SI	M
	Wheatland		7/24/63	605,842	362,664	968,506	Prod. and SI	M
	Wolf Creek	Black Run	12/29/81	1,872	2,520	4,392	Prod. and SI	M
		Kilgore	10/26/66	1,020,733	189,455	1,210,188	Prod.	L
Mercer and Venango	Utica	French Creek	7/26/81	0	80,056	80,056	Prod. and SI	M
Potter	Ulysses	Newfield	10/ 2/39	4,567,466	19,216	4,614,511	Prod.	O
			4/ 2/62		27,829			
Somerset	Bakersville		1/14/79	532,283	36,082	568,365	Prod. and aban.	O
	Boswell		11/11/58		147,658			
		Edie	10/18/68	11,796,658	3,592	11,963,628	Prod. and SI	O
		Snyder	6/16/60		15,720			
	Brier Knob		7/ 4/80	0	0	0	SI	O
	Heckman Hollow		8/16/77	1,622,287	335,856	1,958,143	Prod.	O
	Kimmel		5/ 9/80	448,466	57,112	505,578	Prod.	O
	Kings Bridge		3/29/81	0	0	0	SI	O
	Rockwood		5/28/79	425,416	174,472	599,888	Prod.	O
	Shade Creek		10/ 3/77	748,096	230,351	978,447	Prod.	O
	Shamrock		5/10/79	2,232,905	138,517	2,371,422	Prod.	O
	Shanksville		9/22/73	5,206,373	240,670	5,447,043	Prod.	O
	Somerset East		10/ 7/79	425,423	265,029	690,452	Prod.	O
	Somerset West		1/ 6/78	1,384,259	506,060	1,890,319	Prod.	O

Tioga	South Wellsboro		2/ 2/82	0	0	0	SI	O
Venango	Barkeyville	Duncan	4/ 5/73	131,978	5,174	137,152	Prod.	M
	Cooperstown	Beatty Run	7/30/82	61,420	608,157	669,577	Prod. and SI	M
	Foster-Reno	Coal City	2/16/82	0	0	0	SI	M
		Victory Run	2/ 1/82	0	0	0	SI	M
	Franklin-Oak Forest	Galloway	11/12/73	70,131	1,247	71,378	Prod. and SI	M
	McCune Run	Canal	5/25/82	355,430	527,686	883,116	Prod.	M
	Sugar Creek-Niles	Takitezy	7/26/82	0	36,880	36,880	Prod. and aban.	M
	Wesley	Irwin	12/ 1/72	343,747	13,409	357,156	Prod. and SI	M
Warren	Colorado	Seldom Seen	1/11/84	0	18,000	18,000	Prod.	M
	Columbus	Dewey Corners	2/10/81	351,638	561,690	913,328	Prod. and SI	M
		Whites Run	10/30/75	85,524	96,280	181,804	Prod. and SI	M
	Goodwill Hill-Grand Valley	Campbell Creek	11/14/81	0	90,973	0	Prod.	M
	Russell	Fox Hill	12/ 7/83	0	0	0	SI	M
	Sanford	Trimm	2/19/81	49,750	128,063	177,813	Prod.	M
	Selkirk	Three Bridge	2/29/81	46,111	58,154	104,265	Prod.	M
	Spring Creek	West Spring Creek	6/15/84	0	0	0	SI	M
	Stillwater		9/26/79	408,605	165,354	573,959	Prod. and SI.	M
		Freehold	8/ 5/80	281,982	127,839	409,821	Prod. and SI	M
		Savko	9/ 5/80	384,831	106,243	491,074	Prod.	M
	Sugar Grove	Loucks	5/ 3/81	0	0	0	SI	M
		Mikrut	7/21/81	3,143	5,266	8,409	Prod.	M
	Youngsville	Blue Eye	11/ 3/80	0	0	0	SI	M
		Pikes Rocks	5/ 1/81	44,694	[4]61,026	105,720	Prod.	M
Washington	Buffalo	Garrett Hill	6/15/82	7,216	22,409	29,625	Prod.	MS
	Lone Pine	Glyde	9/ 6/61	148,677	3,996	152,673	Prod.	O
Westmoreland	Crabtree	Dry Ridge	8/25/46	6,349,232	87,630	6,436,862	Prod.	O
	Linn Run		4/25/79	224,806	81,610	306,416	Prod.	O
	Lycippus	*TOTAL*	*8/17/49*	*6,751,266*	*41,704*	*6,792,970*	*Prod.*	O
		St. Boniface Chapel	9/13/56	6,011,838	41,704	6,053,542	Prod.	O
	Murrysville	*TOTAL*	*11/ 3/1878*	*778,920*	*0*	*778,920*	*SI*	O
		Duquesne	8/ 8/65	650,803	0	650,803	SI	O
	New Alexandria	Kahl	10/23/62	11,371,257	141,798	11,513,055	Prod. and SI	O
		Keystone	7/10/81	65,087	18,430	83,517	Prod.	O
Westmoreland and Somerset	Johnstown	Baldwin	5/22/60	12,369,693	130,714	12,717,287	Prod.	O
		Beck	5/16/57		216,880			
		Williams	2/14/58	19,196,335	151,478	19,347,813	Prod.	O
	Seven Springs	*TOTAL*	*12/ 5/58*	*8,236,680*	*189,079*	*8,425,759*	*Prod.*	O
		Blair Oriskany	12/ 5/58	6,595,064	25,406	6,637,201	Prod.	O
		Tunnel	3/10/65		16,731			
		Myersbrook	7/16/82	133,722	129,496	263,218	Prod.	O
		Seven Springs	8/ 3/66	795,471	17,446	812,917	Prod.	O

[1]Mcf=thousand cubic feet.

[2]Aban.=abandoned; gas stor.=gas storage; prod.=producing; and SI=shut-in.

[3]MS=Marcellus Shale; N=Onondaga Formation; O=Oriskany Sandstone; H=Helderberg Group/Bass Islands Dolomite; S=Salina Group; L=Lockport Dolomite; M=Medina Group; T=Tuscarora Formation; BE=Bald Eagle Formation; C=Cambrian formations.

[4]Production estimated based on previous year.

[5]Includes Rugg pool.

Figure 22. *Deep gas production in Pennsylvania in 1984 by producing formations.*

Producing formation	*Cumulative production at end of 1983 (Mcf)*[1]	*Production in 1984 (Mcf)*[1]	*Cumulative production at end of 1984 (Mcf)*[1]
Marcellus Formation (deep black shale)	25,216	33,409	58,625
Onondaga Limestone	1,515,209	170,169	1,685,378
Oriskany Sandstone, Huntersville Chert, and Ridgeley Formation	1,259,063,121	7,740,815	1,266,803,936
Bass Islands Dolomite and Helderberg Group	12,133	45,598	57,731
Salina Group	2,631	8,235	10,866
Lockport Dolomite	1,023,363	189,455	1,212,818
Medina Group	96,919,637	23,823,837	120,743,474
Tuscarora Sandstone	2,439,609	344,091	2,783,700
Bald Eagle Formation	312,100	726,373	1,038,473
Gatesburg Formation and Little Falls Dolomite	203,200	2,000	205,200
TOTAL	1,361,516,219	33,083,982	1,394,600,201

[1]Mcf=thousand cubic feet.

in the Leidy field, Clinton County. The well flowed 145,000 Mcfgpd from the Ridgeley Sandstone at 6,339 feet when drilled in 1951. The largest initial production for oil in Pennsylvania is, once again, a basin record as well. The Jennings Brothers #1 Mathews in the McDonald-McCurdy field, Allegheny County, flowed between 12,000 and 21,000 bopd (barrels of oil per day) from the Fifth sand (Venango Group) in 1891.

OIL AND GAS EXPLORATORY AND DEVELOPMENT ACTIVITIES

The Pennsylvania Geological Survey, Oil and Gas Geology Division, uses a classification scheme for exploratory and development drilling which is modified from the definitions used by the Committee on Statistics of Drilling of the American Petroleum Institute/American Association of Petroleum Geologists. All wells reported here are the same as those reported under drilling and completions in the previous section of this report. Figure 24 is a summary of exploratory, development, and service drilling activity in Pennsylvania in 1984.

EXPLORATORY WELLS

An exploratory well is one that is drilled to: (1) find and produce oil or gas in unproven areas; (2) find a new reservoir in an area previously known to have oil and/or gas production in another reservoir; or (3) extend the known limit of a productive oil or gas reservoir. The exploratory categories include new field wildcats, new pool wildcats, deeper pool tests, shallower pool tests, and outpost/extension tests. If the well is drilled as an exploratory test and is not completed for production, it is classified as a dry exploratory hole.

Exploratory drilling in Pennsylvania decreased during the year by 30 percent, from 122 wells reported in 1983 to 86 wells reported in 1984. The success rate for these wells was 90 percent, which is a small increase over the previous year. Figure 25 shows the breakdown of exploratory drilling by classification. All exploratory successes and the more important exploratory failures of 1984 are illustrated in Figure 26, and these wells are listed in Figures 27 and 28.

DEVELOPMENT WELLS

A development well is one that is drilled within a proven area of production to a known productive stratigraphic horizon. A producing well in such an area and reservoir is classified as an oil or gas development well. It is considered a dry development well if it is not completed for production.

Development drilling in Pennsylvania during the year increased by 5 percent from 2,340 wells in 1983 to 2,466 wells in 1984. The success rate for all development drilling remained at the 98 percent level set originally in 1982.

HIGHLIGHTS OF 1984 EXPLORATION AND DEVELOPMENT

Drilling for shallow targets (Pennsylvanian, Mississippian, and Upper Devonian) has been the

Figure 23. *Production, unit price, and total value of crude oil and natural gas produced in Pennsylvania, 1960–84.*

	CRUDE OIL			NATURAL GAS			Total oil and gas value
Year	Production[1] (bbl)	Average yearly price (dollars/bbl)	Total value (dollars)	Production[2] (Mcf)[4]	Average yearly price[3] (dollars/Mcf)[4]	Total value (dollars)	(dollars)
1960	5,942,000	4.57	27,154,940	119,671,000	0.26	31,114,460	58,269,400
1961	5,580,000	4.76	26,560,800	98,318,000	.26	25,562,680	52,123,480
1962	5,238,000	4.63	24,251,940	87,308,000	.26	22,700,080	46,952,020
1963	5,014,000	4.63	23,214,820	92,340,000	.26	24,008,400	47,223,220
1964	5,113,000	4.48	22,906,240	85,322,000	.26	22,183,720	45,089,960
1965	4,859,000	4.20	20,407,800	82,668,000	.26	21,493,680	41,901,480
1966	4,349,000	4.33	18,831,170	91,365,000	.26	23,754,900	42,586,070
1967	4,409,000	4.35	19,179,150	89,966,000	.26	23,391,160	42,570,310
1968	4,160,000	4.35	18,096,000	87,987,000	.28	24,636,360	42,732,360
1969	4,448,000	4.29	19,081,920	79,134,000	.26	20,574,840	39,656,760
1970	4,015,000	4.27	17,144,050	77,535,000	.27	20,934,450	38,078,500
1971	3,798,000	4.47	16,977,060	76,451,000	.30	22,935,300	33,912,360
1972	3,441,000	4.60	15,828,600	73,958,000	.45	33,281,100	48,109,700
1973	3,282,000	5.73	18,805,860	78,514,000	.45	35,331,300	54,137,160
1974	3,399,000	8.43	28,653,570	82,735,000	.50	41,367,500	70,021,070
1975	3,199,000	9.26	29,622,740	84,772,000	.80	67,817,600	97,440,340
1976	2,950,000	11.51	33,954,500	89,974,000	.85	76,477,900	110,432,400
1977	2,659,000	14.22	37,810,980	92,293,000	1.00	92,293,000	130,103,980
1978	2,820,000	14.77	41,651,400	97,763,000	1.25	122,203,750	163,855,150
1979	2,817,000	23.67	66,678,390	96,313,000	1.40	134,838,200	201,516,590
1980	2,940,000	37.42	110,014,800	97,439,000	1.50	146,158,500	256,173,300
1981	3,729,000	36.33	135,474,570	122,454,000	2.00	244,908,000	380,382,570
1982	4,282,000	31.42	134,540,440	121,111,000	2.80	339,110,800	473,651,240
1983	4,491,000	28.18	126,556,380	118,372,000	3.00	355,116,000	481,672,380
1984	4,825,000	27.64	133,363,000	166,342,000	3.25	540,611,500	673,974,500

[1]Oil production figure courtesy of the American Petroleum Institute Crude Oil Reserve Committee and the Penn Grade Crude Association.
[2]Gas production figure courtesy of the American Gas Association.
[3]Gas prices estimated only.
[4]Mcf=thousand cubic feet.

Figure 24. *Exploratory and primary development and drilling footages reported, 1984 and 1983.*

Type of well	*1984 Wells*	*1984 Footage*	*1983 Wells*	*1983 Footage*	*% Change in footage*
Exploratory					
Gas	74	343,668	94	467,918	
Oil	2	2,594	10	15,413	
Oil and gas	1	1,180	3	9,656	
Dry	9	59,048	15	47,066	
Total (% successful)	86 (90%)	406,490	122 (88%)	540,053	— 25
Development					
Gas	1,305	4,336,391	836	3,019,933	
Oil	1,071	1,233,282	1,426	1,547,956	
Oil and gas	39	86,215	30	60,008	
Dry	51	90,953	48	81,058	
Total (% successful)	2,466 (98%)	5,746,841	2,340 (98%)	4,708,955	+ 22
Miscellaneous wells					
Service	46	84,924	78	142,837	— 41
TOTAL ALL WELLS DRILLED	2,598 (98%)	6,238,255	2,540 (98%)	5,391,845	+16

Figure 25. *Exploratory drilling in Pennsylvania by classification and type of well, 1984.*

Classification and type of well	*No. of wells*	*Footage*
NEW FIELD WILDCATS		
Gas	1	5,800
Dry	3	23,427
Subtotal	4	29,227
NEW POOL WILDCATS		
Gas	3	18,531
Subtotal	3	18,531
DEEPER POOL TESTS		
Gas	6	28,567
Oil	1	1,792
Dry	2	14,039
Subtotal	9	44,398
SHALLOWER POOL TESTS		
Gas	6	21,958
Dry	1	2,544
Subtotal	7	24,502
OUTPOST EXTENSIONS		
Gas	58	268,812
Oil	1	802
Oil and gas	1	1,180
Dry	3	19,038
Subtotal	63	289,832
GRAND TOTAL EXPLORATORY WELLS	86	406,490

mainstay of the oil and gas industry in Pennsylvania since Drake's historic discovery over 125 years ago. Important early fields were mainly in the Venango Group sandstones (Figure 29) of the western counties, but Bradford Group reservoirs quickly gained prominence in the northern counties. Of the estimated 250,000 wells drilled for oil and gas in Pennsylvania since 1859, probably 95 percent or more were drilled to Venango and Bradford Group targets.

Venango Group reservoirs probably exist throughout the oil and gas belt of Pennsylvania, but production, particularly of oil, has been almost restricted to the western third of the Allegheny Plateau. This trend continued in 1984 as 667 Venango Group wells were drilled in Pennsylvania (Figure 20). There is, however, great potential for Venango Group gas production in the central and eastern Plateau counties, especially in conjunction with deeper Bradford Group targets. Some operators drill and case through the Venango Group on their way to "known" targets in the Bradford Group sandstone without evaluating the potential of the section. Yet the large numbers of wells having commingled Venango and Bradford production (Figure 20) point to the need for complete evaluation of the entire sequence of sandstones, siltstones, and shales in the well.

Most of the shallow gas wells (and many of the shallow oil wells) drilled in Pennsylvania in the past 25 years were completed in the Bradford Group reservoirs of the central and northern Plateau. Drilling trends in the Bradford sandstones have tended to be basically developmental. Operators have shied away from exploratory drilling in favor of drilling within long-established fields or on the

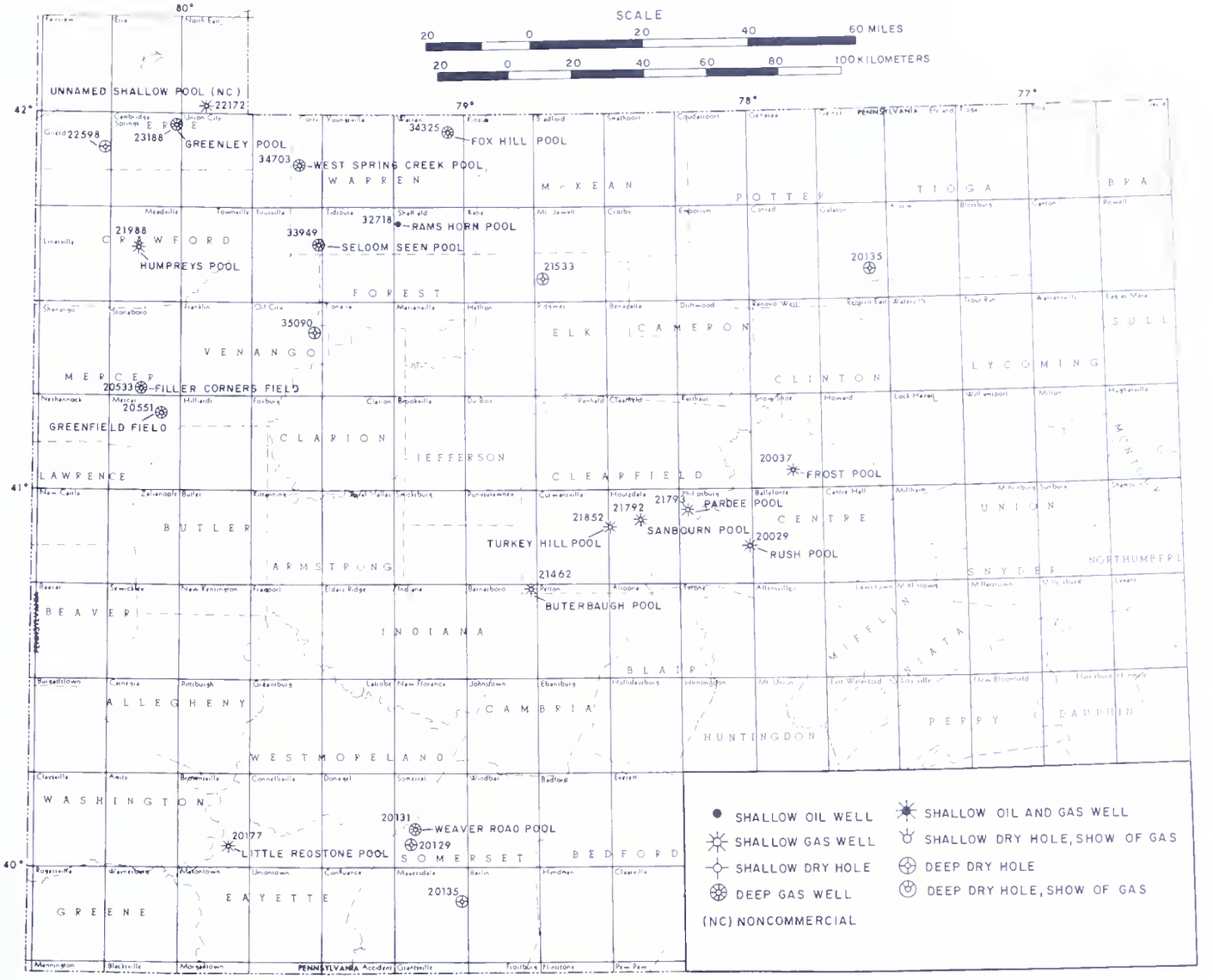


Figure 26. Map of exploratory wells in Pennsylvania reported in 1984.

margins of those fields. This has only recently begun to be rectified as some sparse wildcatting to the east of the established fields opened new reservoirs. Perhaps the most interesting Bradford Group drilling was an ambitious program of wildcat drilling in remote areas of Clearfield County by J & J Enterprises. All of the wells in this program had shows of gas, and many have been determined to be economical. One such well, the J & J Enterprises #2 Marshall and Bell, had a guaged open flow of 1,343 Mcfgpd from the commingled Venango and Bradford Groups in Knox Township. This, the discovery of the Turkey Hill pool in the Lumber City field, was the best of the wells. Other wells, typically outpost-extension wells of established fields, had flows as low as 45 or 50 Mcfgpd.

Besides Venango and Bradford Group sandstones, several other Upper Devonian reservoirs were targeted for drilling in 1984. These included the Elk Group, the Catskill, Lock Haven, Brallier, and Harrell Formations, and the black, organic-rich Ohio Shale.

The Elk Group (Figure 29) was penetrated in many wells in western Pennsylvania, but new production was discovered in only one well, the Fox Oil and Gas #2 Buterbaugh well in Burnside Township, Clearfield County. This deeper pool discovery, commingled with production from Bradford Group sandstones, tested at 1,500 Mcfgpd. The well discovered the Buterbaugh pool in Burnside field, an area of, historically, Venango and Bradford Group production.

The eastern Plateau equivalents of the Venango, Bradford, and Elk Groups are the Catskill and Lock Haven Formations (Figure 29). Although there has been very little drilling in these rocks in the past, the discovery of some important new gas production in Centre County has recently created a flurry of interest. The discovery of the Council Run field in 1982 by Eastern States Exploration pointed out the dis-

Figure 27. *Reported new field and new pool discoveries in Pennsylvania, 1984*

County and permit no.	*Quadrangle*	*Operator well no. and lease*	*Completion date (M-Day-Y)*	*Total depth (feet)*	*Name of formation at T.D.*[1]	*Prod. depth (feet)*	*Prod. formation or zone*[1]	*Initial daily prod. (in Mcf*[2] *except where noted)*	*Field or pool name*	*Explor. class*[3]
Centre CEN-20029	Black Moshannon	Eastern States Exploration #1 Commonwealth of Pa. Tr. 246	1-27-84	7,111	Harrell (D)	6,823	Brallier and Harrell (D)	119	Rush pool	SPD
Centre CEN-20037	Snow Shoe SE	Eastern States Exploration #1 E. D. Frost	10-21-83	4,655	Lock Haven (D)	4,420	Lock Haven (D)	267	Frost pool	SPD
Clearfield CLE-21462	Barnesboro	Fox Oil and Gas, Inc. #2 Earl Buterbaugh	5-19-83	4,532	Elk Group (D)	4,297	Bradford and Elk Gps. (D)	1,500	Buterbaugh pool	DPD
Clearfield CLE-21792	Glen Richey	J & J Enterprises, Inc. #1 J. Weaver and W. Chase, Jr.	6- 6-84	5,029	Elk Group (D)	4,266	Venango and Bradford Gps. (D)	50	Sanbourn pool	NPD
Clearfield CLE-21793	Philipsburg	J & J Enterprises, Inc. #1 Dorothy Hess	5-25-84	5,023	Lock Haven (D)	4,919	Catskill and Lock Haven (D)	100	Pardee pool	SPD
Clearfield CLE-21852	Glen Richey	J & J Enterprises, Inc. #2 M. Marshall & E. Bell	7- 1-84	4,519	Bradford Group (D)	4,368	Venango and Bradford Gps. (D)	1,343	Turkey Hill pool	NPD
Crawford CRA-21988	Meadville	Robert R. Laderer #1 Humphreys Master Cleaners	8-19-83	1,500	Ohio Shale (D)	1,295	Ohio Shale (D)	44	Humphreys pool	SPD
Erie ERI-22172	Hammett	Dennis Hancock #1 Dennis Hancock	1-14-83	1,000	Ohio Shale (D)	725	Ohio Shale (D)	6	Unnamed shallow pool (NC)[4]	SPD
Erie ERI-23188	Cambridge Springs NE	NRM Petroleum Corporation #1 Edward and Mary Mitchell	10-11-83	2,669	Keyser (S)	2,643	Bass Islands (S)	4,108	Greenley pool	SPD
Fayette FAY-20177-D	Fayette City	George A. Burgly, Jr. #1 Robert Warfel	7-29-83	3,770	Brallier (D)	3,660	Venango and Brallier (D)	102	Little Redstone pool	DPD
Mercer MER-20533	Jackson Center	Mitchell Energy Corporation #1 M. Halliday Unit	8- 8-83	5,905	Queenston (O)	5,814	Medina (S)	412	Filer Corners pool	DPD
Mercer MER-20551	Greenfield	Haddad and Brooks, Inc. #1 P. Bartholomew	5-17-84	5,800	Queenston (O)	5,595	Medina (S)	879	Greenfield field	NFD
Somerset SOM-20131	Bakersville	Ashtola Production Company #1 Commonwealth of Pa. (Hays)	3-15-84	8,983	Helderberg (D)	8,922	Ridgeley (D)	5,400	Weaver Road pool	NPD
Warren WAR-32718	Cherry Grove	Albright Drilling Company #1 Warrant 5245	12-31-83	1,792	Bradford Group (D)	1,608	Bradford Group (D)	1.5 (bbl)	Rams Horn pool	DPD
Warren WAR-33949	Grand Valley	Quaker State Resources #1 Rensma Stephens	1-11-84	5,922	Queenston (O)	5,780	Medina (S)	1,750	Seldom Seen pool	DPD
Warren WAR-34325	Scandia	Mitchell Energy Corp. #1 L. Werner	12- 7-83	5,560	Queenston (O)	5,421	Medina (S)	75	Fox Hill pool	DPD
Warren WAR-34703	Spring Creek	Universal Resources Holdings #1 Swart Drilling Unit	6-15-84	5,078	Queenston (O)	4,957	Medina (S)	1,509	West Spring Creek pool	DPD

[1](D)=Devonian; (S)=Silurian; (O)=Ordovician.

[2]Mcf=thousand cubic feet.

[3]NFD=new field discovery; NPD=new pool discovery; DPD=deeper pool discovery; SPD=shallower pool discovery.

[4]NC=noncommercial.

Figure 28. *Selected exploratory failures reported in Pennsylvania, 1984*

County and permit no.	*Quadrangle*	*Operator well no. and lease*	*Completion date (M-Day-Y)*	*Total depth (feet)*	*Name of formation at T.D.*[1]	*Explor. class*[2]
Elk ELK–21533	Wilcox	Hanley and Bird #1734 Texas Gulf, Inc.	7-31-84	7,322	Medina/Tuscarora (S)	DPT
Erie ERI–22598	Albion	Envirogas, Inc. #4 H. Mikovch	2- 5-83	2,544	Oriskany (D)	SPT
Somerset SOM–20129	Bakersville	Ashtola Production Co. #1 H. George Doolittle	11-23-83	8,475	Ridgeley (D)	NFW
Somerset SOM–20135	Murdock	Cabot Oil and Gas Corp. #1 Ray Hauger	8-18-84	8,787	Ridgeley (D)	NFW
Tioga TIO–20135	Lee Fire Tower	Adobe Oil and Gas Corp. #1 Commonwealth of Pa. Tr. 561	1-15-84	6,165	Helderberg (D)	NFW
Venango VEN–35090	President	Cabot Oil and Gas Corp. #1 Elizabeth Neidel, et al.	6- 7-83	6,717	Queenston (O)	DPT

[1](D)=Devonian; (S)=Silurian; (O)=Ordovician.

[2]NFW=new field wildcat; DPT=deeper pool test; SPT=shallower pool test.

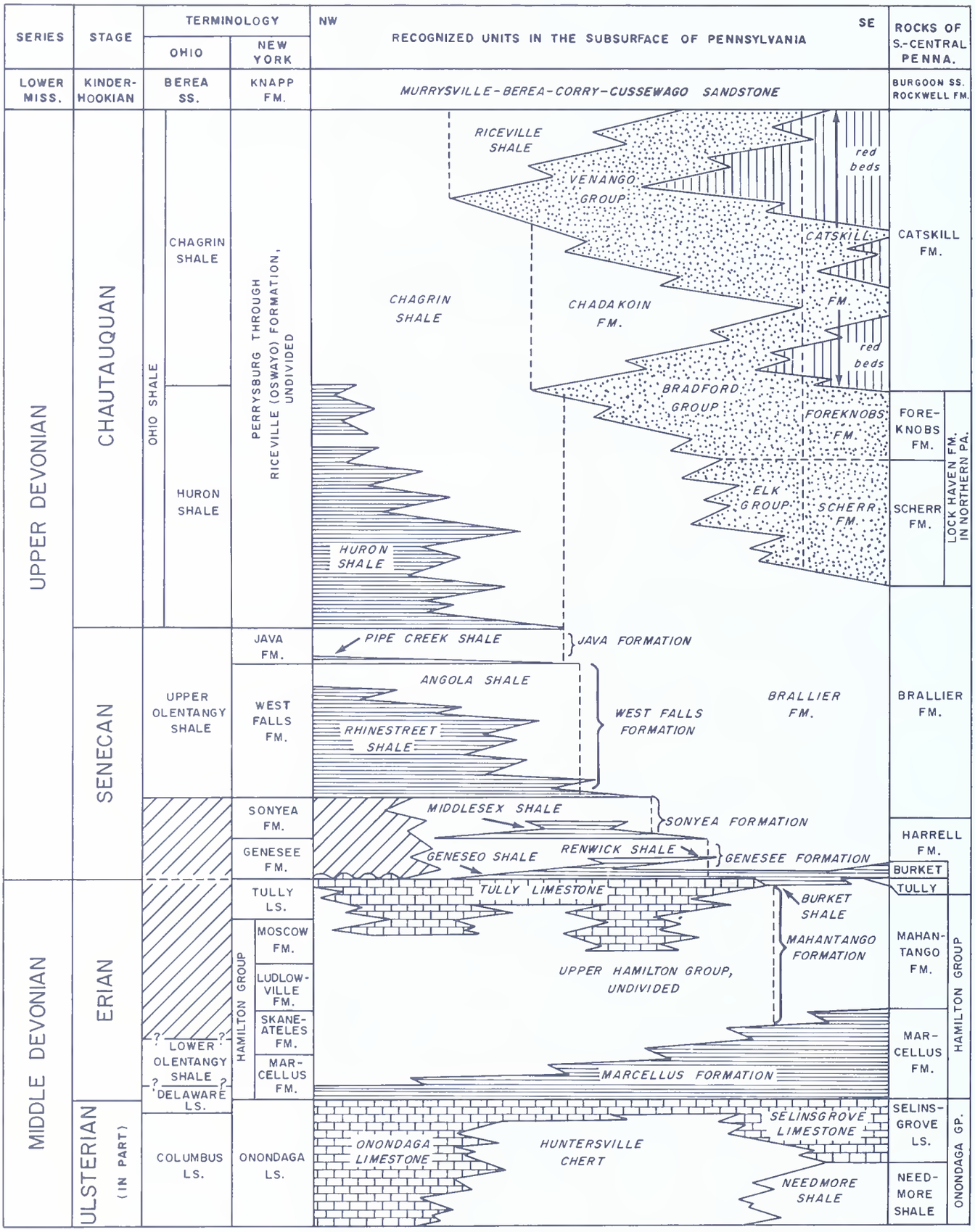


Figure 29. Schematic diagram of Upper and Middle Devonian stratigraphic units from the surface and subsurface of western Pennsylvania.

tinct possibility of excellent production from these thoroughly unknown rocks. Eastern States (and other companies) has drilled over 20 wells in Centre County just west of the Allegheny Front, and discovered 4 new fields and pools since 1982 (see, for example, the data on the Frost pool in Figure 27). Most of the interest, however, has remained with the Council Run field in Spruell State Forest and adjacent privately owned lands. Based on admittedly sparse data, the best production in the field comes from an elongate sand body oriented parallel to regional strike (approximately N35°E) about 3,000 feet below sea level. The main body of the lens exceeds 40 feet in a limited area and, probably not coincidentally, is cut by an apparent fault (Figure 30). The fault is postulated on the basis of a structural offset (seen in the structural cross section at the top of Figure 30), an apparent thickening of the sandstone lens (seen at the bottom of Figure 30), and a prominent lineament observed in the area. Possibly, the proposed fault was reactivated several times, accounting for the anomalous thickening of the sandstone on the downthrown side of the fault. At the time of this writing, 25 wells had been reported from the Council Run field. Of these, 7 wells had natural open flows exceeding 1,000 Mcfgpd. Production from the field is reported to be very high in comparison to other Upper Devonian fields.

Eastern States also discovered an entirely new reservoir in 1984 with the completion of the #1 Commonwealth of Pennsylvania Tract 246. This well had an open flow of only 119 Mcfgpd, but the production was from commingled Brallier and Harrell Formations (Figure 29) in the Black Moshannon field, Centre County. This is the first production from shales and siltstones of the Harrell Formation in Pennsylvania, and the first production from the turbidite sequences of the Brallier Formation in Centre County. Previous Brallier reservoirs have been known from southwestern Pennsylvania for many years (western siltstone

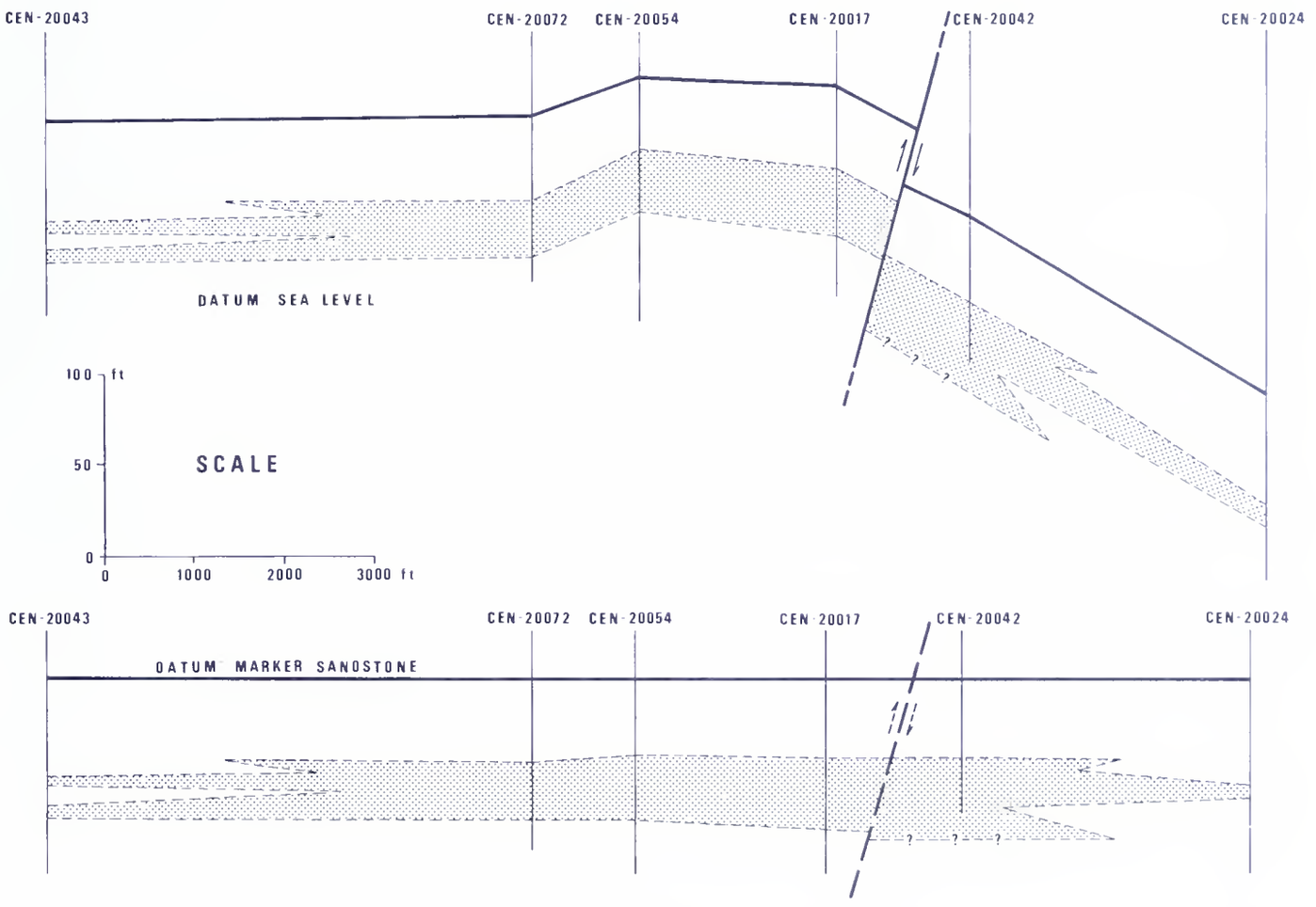


Figure 30. Two cross sections through Council Run field, Centre County. The upper figure is a structural cross section showing offset of the best producing sandstone (stippled) unit by a fault. The lower section is a paleostructural cross section of the field at the time of deposition of the marker sandstone. The fault is inferred to have existed at that time because of anomalous thickening of the sandstone.

equivalents of the Bradford and Elk Group sandstones, especially in Washington and Greene Counties). Indeed, the Little Redstone pool in the Kenneth field, Fayette County, discovered by the George Burgly #1 Warfel well, was the most recent such reservoir find in this western area.

Drilling for natural gas in the "Devonian shales" in Pennsylvania followed the drilling of Drake's well by less than a year. The first commercial gas well was drilled in the shales in Fredonia, New York, in 1821, and had enough production to light the town. Gas from the shales provided light to the lighthouse at Barcellona, Chautauqua County, New York, for years. By 1860 drilling had begun along the Lake Erie shoreline in Pennsylvania, with the subsequent discovery of natural gas in the city of Erie. For the next 80 years, the shallow depth of the shales (less than 1,000 feet) and the long life of an average well made such wells attractive to the local industry and some home owners. With the resurgence of interest in Devonian shales and shale-gas production in the late 1970's, Erie County home owners, churches, small businesses, and municipalities once again recognized the value of low-cost, long-life domestic gas wells to offset the cost of pipeline gas. Over 300 wells, 192 in 1984 alone, have been reported drilled for gas production from the Upper Devonian Ohio Shale in Erie County since 1979. Volume is generally low, but inasmuch as the gas is used to heat homes, offices, and churches, the large volumes needed for commercial production are unnecessary, and the cost of the wells is generally within the budget of average property owners.

Deep drilling in Pennsylvania was once again dominated by exploratory and development activity in the Lower Silurian reservoirs of northwestern Pennsylvania. As in previous years, however, some interesting and important drilling occurred in other reservoirs and other areas of Pennsylvania.

Four wells were completed in the Lower Devonian Ridgeley Sandstone (Figure 31), including a new pool discovery in the Seven Springs field of Somerset County. The Ashtola Production Company, #1 Commonwealth of Pennsylvania well in Jefferson Township reported an open flow of 5,400 Mcfgpd from a depth of 8,922 feet. Another Ashtola well in Somerset County, the #1 Doolittle, had a natural open flow of 15,000 Mcfgpd, but the well had to be junked and abandoned due to mechanical problems.

An interesting discovery reported in 1984 was the Greenley pool in the Drumlin field, Erie County. The Drumlin field produces mostly from the Lower Silurian at about 3,700 feet below sea level, but the NRM Petroleum Corporation #1 Mitchell well in

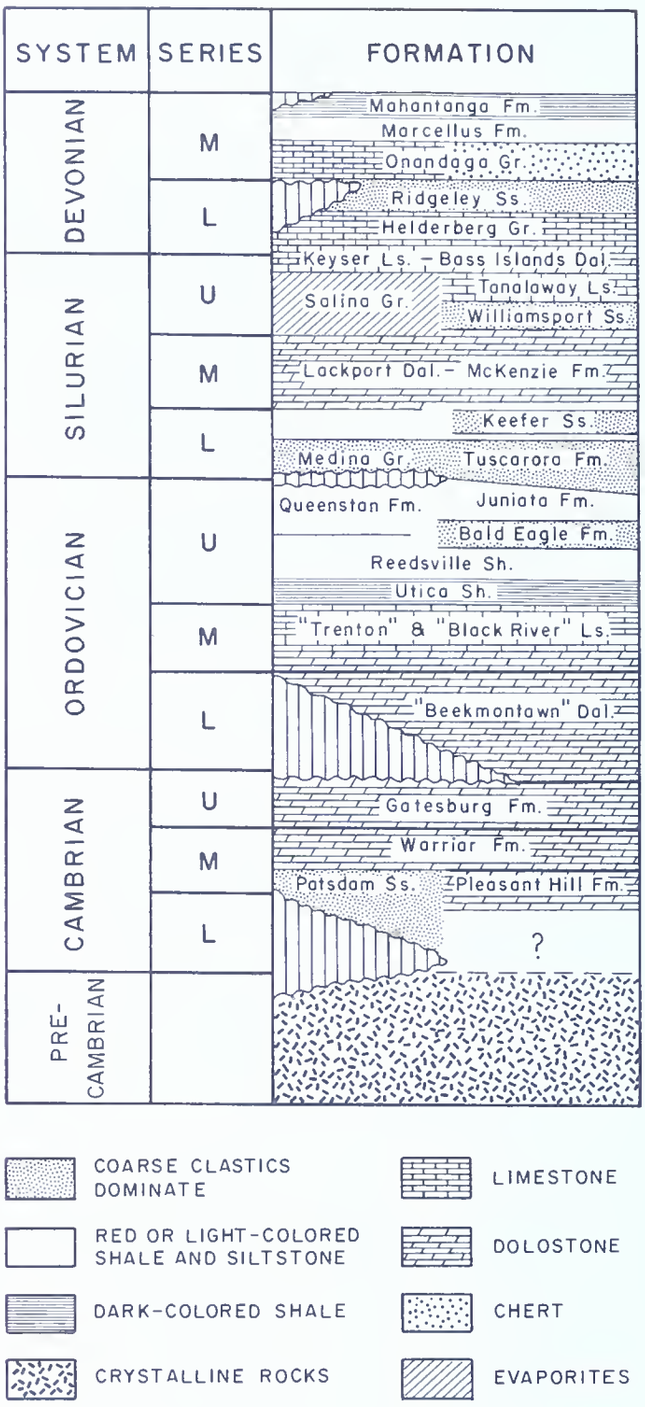


Figure 31. Generalized subsurface diagram of the major deep formations occurring in western Pennsylvania.

Waterford Township penetrated a fault zone at about 1,300 feet below sea level, and the well had a natural open flow of 4,108 Mcfgpd. Since the initial discovery, five additional wells having high natural open flows were drilled in the pool. Production in the pool comes from an interval encompassing the Lower Devonian Bois Blanc Formation and Manlius Limestone and Upper Silurian Bass Islands Dolomite and Salina Group (Figure 31). The Greenley pool may be a southwestern extension of

the Bass Islands play that has kept operators active in western New York. Like the New York play, the Greenley pool occurs in an area where the Salina salt beds created penecontemporaneous (and post-depositional) faulting in the Upper Silurian and Lower Devonian (Figure 32).

Drilling in the Lower Silurian Medina Group (Figure 20) accounted for all but 10 deep producing wells in Pennsylvania in 1984. This continued the trend set in the late 1970's when operators determined that the Medina would qualify for higher prices under Section 107 (High-Cost Gas) of the Natural Gas Policy Act. Most of the Medina discoveries in 1984 were deeper pool tests in established shallow fields. These included the Filers Corners pool in the Cool Spring field, Mercer County, and the Seldom Seen pool in the Colorado field, the Fox Hill pool in the Russell field, and the West Spring Creek pool in the Spring Creek field, all in Warren County. The only new field discovery was the Haddad and Brooks #1 Bartholomew well in Lackawannock Township, Mercer County, which opened the Greenfield field. Although not successful, a deeper pool test of the Medina was drilled by Cabot Oil and Gas in the Hampton-Strong field, President Township, Venango County. The well apparently had the potential to produce natural gas, but Cabot was reluctant to attempt completion and the well was plugged and abandoned after tests were run.

Ultra deep tests (wells deeper than 10,000 feet) became almost common in Pennsylvania in 1984 as four of the nation's largest companies searched for natural gas reservoirs in the "Eastern Overthrust Belt." Texaco U.S.A., in association with Marathon Oil Company, began drilling in Lycoming County for an offset test of their previous wildcat in Grugan Township, Clinton County. In the new well, as in the first, the companies are looking for production from the Upper Ordovician Bald Eagle Formation (Figure 31). This second well had been planned and cancelled during the phase when no one was quite sure what kind of a producer the first well would be. Subsequent incredible production from the first well (see the Grugan field in Figure 21) indicated that an offset would not be out of order. Pennzoil Company was also drilling a test of the Bald Eagle Formation in Lycoming County. The well was reported to be a dry hole, but inasmuch as a well record had not been received by the end of the year, this is not official. Exxon Corporation was nearing completion of drilling in a 13,500-foot well on Tuscarora Mountain, Mifflin County, at the end of 1984. This well was spudded in the Bald Eagle Formation and was targeted to test the Cambro-Ordovician section. A test of the Lower Ordovician

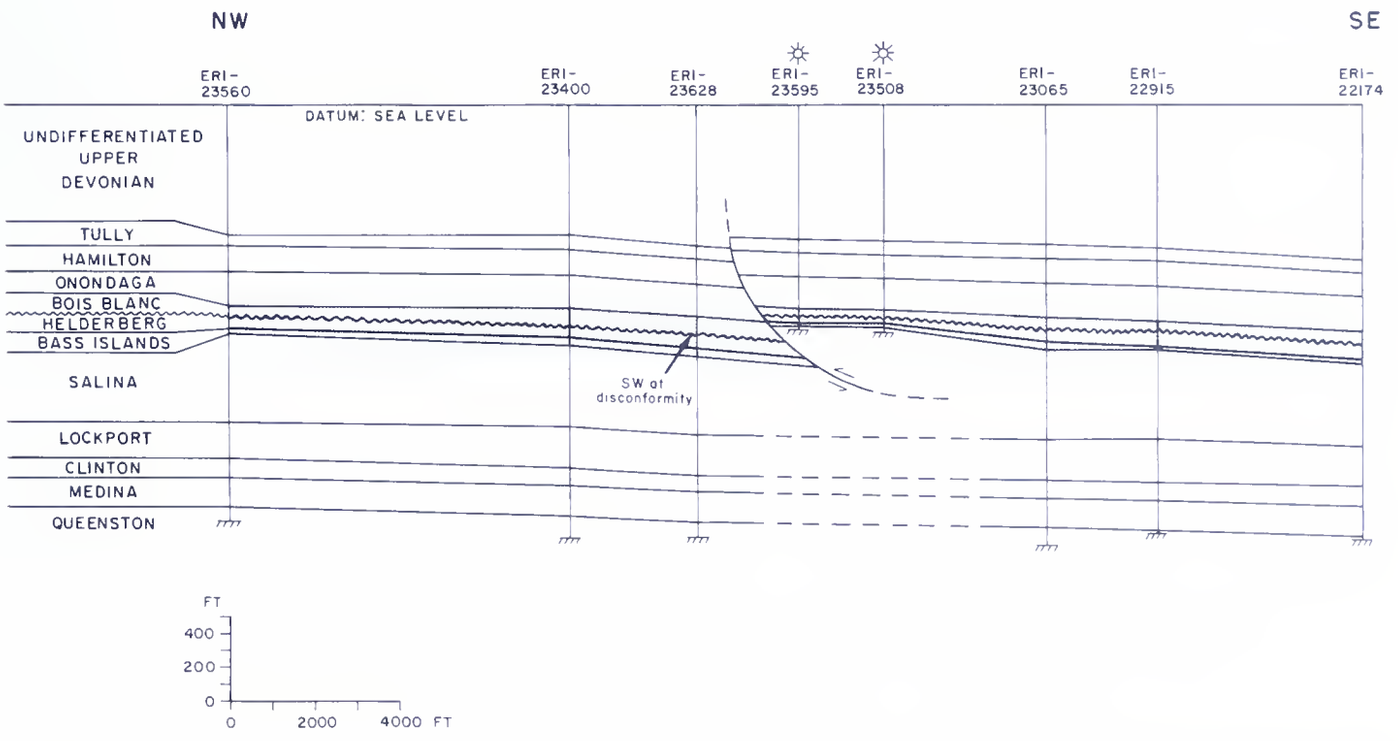


Figure 32. Cross section showing the interpreted trapping mechanism for production in Greenley pool, Swails field, Erie County. Faulting was apparently penecontemporaneous with Late Silurian and Early Devonian deposition, as evidenced by the anomalous thinning of the reservoir (shaded) adjacent to the fault.

Beekmantown Group (Figure 31) drilled by ARCO Oil and Gas in Bedford County was about 75 percent complete. This well was scheduled to be 16,000 feet deep.

One of the more significant developments in Pennsylvania's long history of oil and gas activity occurred in 1984 when North Central Oil Corporation of Houston, Texas, applied for a permit to drill in Bucks County, just north of Philadelphia. The proposed location, in the Riegelsville quadrangle, is about 3 miles from the New Jersey border in the Gettysburg-Newark basin. This is the first test of the Triassic-Jurassic Newark Supergroup since 1962 when the Donelson Company completed a 1,859-foot dry hole in York County. North Central anticipates drilling approximately 12,000 feet in the lacustrine deposits of this eastern rift basin.

"TIGHT FORMATION" DEVELOPMENTS

Operators had incentive to drill to Venango and Bradford Group reservoirs in many areas in 1984. In August 1984 these two Upper Devonian formations were recognized by the Federal Energy Regulatory Commission (FERC) as "tight formations" under NGPA Section 107 (High-Cost Gas). The designations were made for all of Indiana and Fayette Counties (excluding certain "sweet spots") and for large portions of Jefferson, Armstrong, and Westmoreland Counties. A similar filing for the "Catskill-Lock Haven Formation" was also approved for Clearfield and Cambria Counties, and for parts of Clinton and Centre Counties. The designation allowed operators to receive prices for natural gas from new wells as high as $5.90 per Mcf. Most received much less, however, because of stale market conditions. The three Upper Devonian designations followed three years after the designation of "tight formation" for the Lower Silurian Medina Group.

GEOPHYSICAL ACTIVITY IN PENNSYLVANIA

The seismograph is the principal nondrilling exploratory tool used in Pennsylvania for the exploration of oil and gas. The use of seismic tools is advantageous in that it can give approximate to excellent indications of the attitude of rocks (whether they are folded, faulted, tilted, or flat lying) and the depth of potential hydrocarbon reservoirs by measuring the travel time for vibrations generated at the surface to reach the rock. Mechanically generated seismic pulses, especially Vibroseis, and explosive techniques, principally dynamite, are the most widely used in Pennsylvania. Seismic work is typically performed by contracted crews and the intensity of activity is measured in crew-months.

Seismic activity in Pennsylvania decreased in 1984, down 61 percent to 9.2 crew-months from the 23.6 crew-months reported in 1983. It is estimated that use of Vibroseis accounted for 2.3 crew-months and dynamite for 6.9 crew-months of seismic activity. Companies involved in seismic activity included major oil companies, large independents, and small independents; they were Angerman and Associates, ARCO, Columbia Gas, CNG Development, Exxon, Pennzoil, and Quaker State. Surveys were reported in Bedford, Cameron, Clinton, Elk, Erie, Fayette, Forest, Greene, Indiana, Lycoming, McKean, Mercer, Potter, Susquehanna, Warren, Wayne, and Westmoreland Counties.

ACTIVITIES ON STATE FOREST AND PARK LANDS

Total income from oil and gas activities on Pennsylvania State Forest and Park lands during 1984 amounted to $4,589,160.55. This income came from rentals, including bonuses from lease sales, royalties, gas storage rentals, pipeline and compressor station rentals, and seismic surveys. Royalty payments for the year amounted to $1,051,065.47 for 2,821,166 Mcf of gas produced on State land or from unitized acreage. Rentals for existing exploratory acreage and past leasing programs totaled $2,596,954.07, and gas storage rentals totaled $927,993.75. Other income for seismic surveys and for pipeline and compressor station rentals totaled $13,147.25.

During the year a total of 195,210 acres of State Forest and Park lands was offered for bid for oil and gas exploration in 49 tracts. Of this number, 27 tracts totaling 128,418 acres were successfully bid. However, more than half of this acreage, 72,987 acres, will be placed under lease in 1985.

At the end of 1984 a total of 896,064 acres of State Forest and Park lands was under lease for oil and gas exploration and development. Another 100,493 acres was under lease for gas storage located in 10 different gas storage fields.

PENNSYLVANIA'S NEW OIL AND GAS LAWS

Late in 1984 the Pennsylvania General Assembly passed, and the Governor signed, two pieces of legislation that will have great impact on the Com-

monwealth's oil and gas industry in the future. The first of these bills, passed as Senate Bill 402, is a major rewriting of Pennsylvania's old oil and gas law. S. B. 402 (Act 223) regulates the following: well permitting, drilling, and plugging; gas storage operations; protection of water bodies, wetlands, and water supplies; the reporting of drilling and completion information and production data; the filing of logs, cores, and well cuttings, test reports, and other geological and engineering information; the rights of surface owners, coal owners, and water purveyors; and the registration of all nonpermitted wells. House Bill 2100, titled The Coal and Gas Resource Coordination Act, or Act 214, provides for well spacing in coal-producing areas and guarantees an arbitration procedure for disputes between coal owners and oil and gas operators.

Of particular interest to the oil and gas industry is S. B. 402, which was passed after extended negotiations with industry and environmental groups. The major impact of S. B. 402 is that it provides for improved protection of the environment and gives the Commonwealth the opportunity to increase its enforcement capability. Probably the severest impact of the bill is its requirement that all wells must be registered and bonded. The bonding requirement, $2,500 per well, or a blanket bond of $25,000, will affect the small independent operators the greatest. Industry representatives foresee a possible decline in oil and gas activity in Pennsylvania because many small companies will find it difficult to raise the necessary initial capital to drill. Whether this becomes a full-scale problem or not remains to be seen.

S. B. 402 is also of particular significance for the Pennsylvania Geological Survey. The new law makes the Department of Environmental Resources the repository of much additional information, including copies of all logs when requested within 90 days of completion of a well; copies of all drill-stem tests, brine analyses, core reports, lithologic descriptions, mud logs, and other written data if requested within one year; and representative well-cutting and core samples from any well when requested prior to commencement of drilling. All of these logs, tests, reports, cores, and samples must be filed with the Department three years after completion of the well if not otherwise requested. The bill also requires the reporting of annual production by well. The Survey has been reporting deep natural gas production by field and pool since 1960, but for the first time since the late 1800's or early 1900's there will be accurate statistics for both deep and shallow production, oil and gas, in Pennsylvania. These data will in turn be useful in estimating future reserves more realistically. Operators concerned about the disclosure of production figures for their individual wells will find that such information is guaranteed to be confidential for three years. These data will only be published in aggregate form.

PROJECTS IN PROGRESS IN 1984, OIL AND GAS GEOLOGY DIVISION

COMBINED REVISION OF FILING AND BASE-MAP PROCEDURES

The well-file and base-map revision project begun by the Oil and Gas Geology Division in 1982 neared initial completion in 1984. The Division had, for the previous 32 years, used a well-identification system in which an arbitrary file number was assigned to each well based on the 15-minute (1:62,500-scale) topographic quadrangle in which it was located. In order to conform to other state agencies, and to the API well codes used by most of the country, the Division began changing over both its files and its base maps to the Commonwealth's permit number system (the basis of the API well codes). By the end of 1984, all of the modern well records had been reassigned to permit number identifiers and all oil and gas base maps had been changed to 7½-minute (1:24,000-scale) topographic quadrangles. The next step, actually begun in mid-1984, was to provide the public with inexpensive copies of those base maps. To this end, mylar copies of the topographic quadrangles were obtained, and the well locations and permit numbers are being spotted on these. These mylars will be used to make blueline or blackline diazo prints for sale to anyone desiring copies. Details for purchasing base maps can be obtained by contacting the Pennsylvania Geological Survey, Oil and Gas Geology Division, 7th Floor, Highland Building, 121 South Highland Avenue, Pittsburgh, PA 15206–3988, telephone 412-665-2155. Figure 33 shows those portions of Pennsylvania for which base-map coverage is presently available.

GEOLOGY OF THE OIL AND GAS FIELDS OF SOUTHWESTERN PENNSYLVANIA

by John A. Harper and Christopher D. Laughrey

The Oil and Gas Geology Division completed a study of the geology of the oil and gas fields of the southwestern corner of Pennsylvania. The study

Figure 33. Index maps of available (shaded) 7½-minute oil and gas base maps. In the southeastern part of the state, base maps are available for the following quadrangles: Abbottstown, Beavertown, Palmerton, Wellsville, and West York.

Figure 33. *(Continued).*

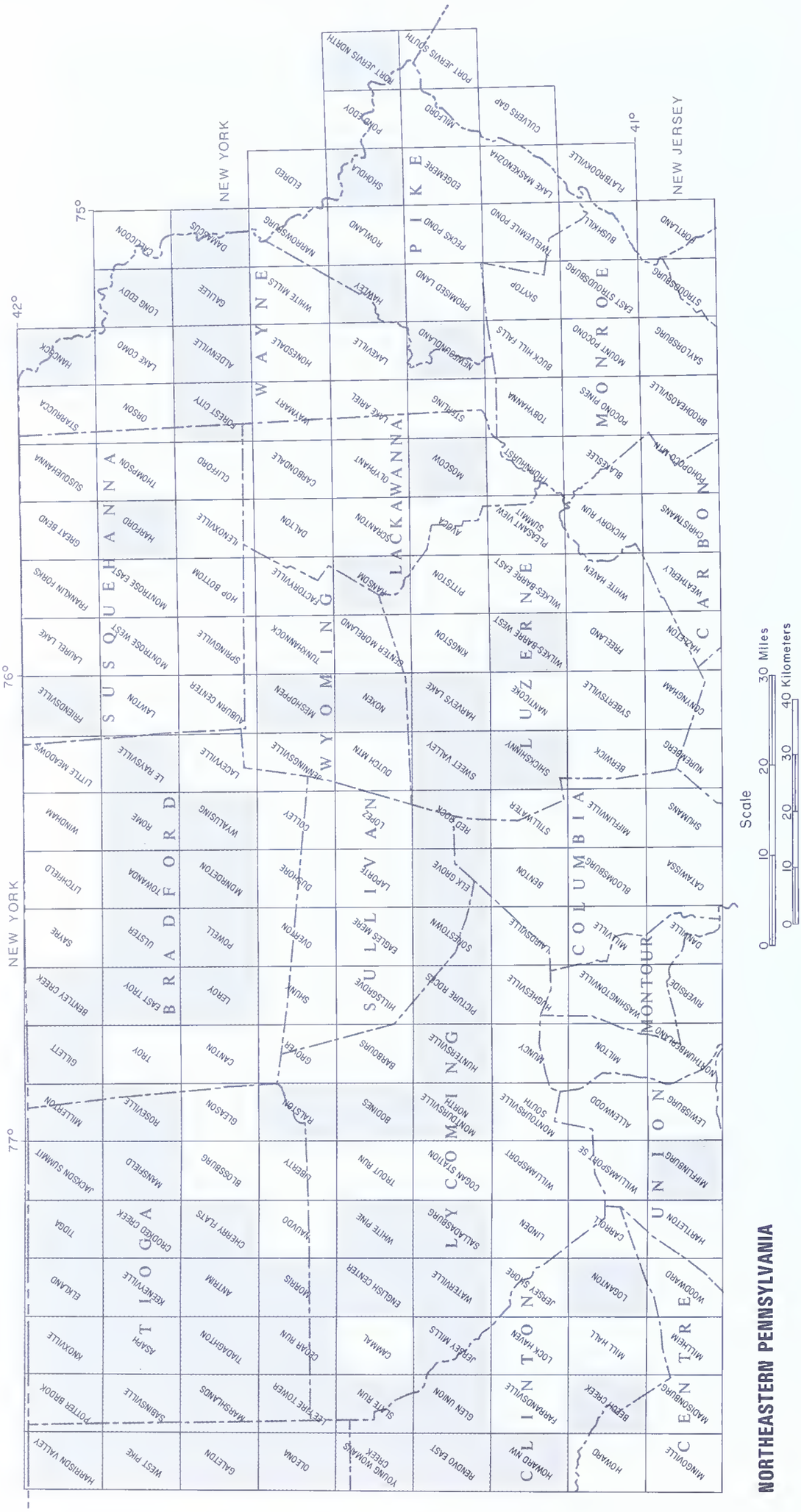


Figure 33. *(Continued).*

area of this project covers all of Greene and Washington Counties and the southern portions of Allegheny and Beaver Counties, basically all of Pennsylvania south of the Ohio River and west of the Monongahela River. The study area has many historically productive oil and gas fields. Production in southwestern Pennsylvania is presently low. Some fields are essentially abandoned, or close to it. More than half of the fields have never had any enhanced recovery operations on them. Gas well drilling in the area is also low compared to other areas of Pennsylvania. But because of the great improvements in completion and production technology over the last 25 years, and because prices for crude oil and natural gas have been substantially higher in recent years than in the historic past, the authors believe the fields in southwestern Pennsylvania have great potential for further exploitation. The study, which is scheduled to be published in 1986, contains information on the stratigraphy, structure, reservoir petrology, and depositional environments of the reservoir sandstones, historical summaries of the oil and gas fields, and a discussion of the types and potential of unconventional hydrocarbon sources in the study area. It is hoped that this report will rekindle interest in the oil and gas fields of an area that has been virtually ignored for the last 50 years.

OIL AND GAS RESERVOIR ROCKS OF PENNSYLVANIA

by Christopher D. Laughrey and Robert M. Harper

Work in progress at the Oil and Gas Geology Division includes a compilation of petrologic and petrophysical data from the various hydrocarbon reservoir rocks of the Commonwealth. The planned report is meant to supplement the map *Oil and Gas Fields of Pennsylvania* (Pennsylvania Geological Survey Map 3, scale 1:250,000). Every effort is being made to obtain and organize sample information from the oil and gas fields of the state into a format compatible with the objectives of the compilation. These objectives are as follows:

(1) Outline the mineralogy, texture, diagenesis, porosity, and permeability characteristics of the principal reservoir rocks in each of the major productive areas.
(2) Explain variation from low-permeability ("tight") to high-permeability ("sweet") zones in seemingly similar reservoir situations.
(3) Describe the depositional environment and reservoir configuration of gas and oil pools in Pennsylvania.
(4) Discuss the potential reservoir and completion problems operators may expect to encounter in different pools in the state.

The study entails the compilation of thin-section and scanning-electron-microscope (SEM) petrographic data, core analyses, X-ray diffraction data, and geophysical information. The completed report should provide operators with a comprehensive guide to geological appraisal of Pennsylvania's reservoir rocks and make available fundamental data for planning profitable exploration and exploitation programs.

OPEN-FILE REPORTS AND OTHER DATA AVAILABLE

The following reports and other data are available on open file at the Pennsylvania Geological Survey, Oil and Gas Geology Division, 7th Floor, Highland Building, 121 South Highland Avenue, Pittsburgh, Pennsylvania 15206–3988.

(1) *Surface to Middle Devonian (Onondagan) Stratigraphy, Part I (STOMDES),* 1972, by D. R. Kelley and W. R. Wagner, 15p., 8 cross sections, vertical scale 1 inch=100 feet.
(2) *Deep Sand Exploration and Gas Developments in Pennsylvania,* 1982, by L. J. Balogh, 2 map sheets, scale 1:250,000 (last updated in 1982).
(3) *Salina or Equivalent and Deeper Penetrations of Pennsylvania,* 1973, by D. R. Kelley and L. J. Balogh, 1 map, scale 1:500,000 (last updated in 1979).
(4) *Tully and Deeper Formations, Brine Analysis of Pennsylvania,* 1973, by D. R. Kelley and L. A. Heeren, 1 chart and map, scale 1:500,000.
(5) *Stratigraphic Framework of the Greater Pittsburgh Area, Parts I and II,* 1972, by W. R. Wagner and W. S. Lytle, 20 p., 9 sections in 13 sheets.
(6) *Active Gas Storage Areas Map of Pennsylvania,* 1981, by L. J. Balogh, 1 map, scale 1:500,000 (updated as needed).
(7) *Subsurface Rock Correlation Diagram, Allegheny Plateau, Pennsylvania,* 1979, by J. A. Harper, 1 sheet.

There are also over 42,000 drillers' records and logs, along with approximately 4,500 mechanical logs, on open file at the Pennsylvania Geological

Survey's Pittsburgh office. Approximately 44,000 well-data cards, compiled by the U.S. Geological Survey and the Pennsylvania Geological Survey between 1900 and 1970 as the bases of topographic map quadrangle reports, are also on open file. In addition, the Survey has a sample library containing drill cuttings from approximately 1,200 wells, and a core-storage library containing cores from 39 wells, including the five wells cored under the U.S. Department of Energy's Eastern Gas Shales Program. All cuttings and cores are available for inspection and study.

PROJECT PUBLISHED IN 1984, OIL AND GAS GEOLOGY DIVISION

PETROLOGY AND RESERVOIR CHARACTERISTICS OF THE LOWER SILURIAN MEDINA GROUP SANDSTONES, ATHENS AND GENEVA FIELDS, CRAWFORD COUNTY, PENNSYLVANIA

by Christopher D. Laughrey

Exploration and development of the Lower Silurian Medina Group clastics presently dominates deep drilling activity along the northwestern flank of the central Appalachian basin. In Pennsylvania, Medina production is from very fine to medium-grained sandstones that form low-permeability and low-pressure reservoirs across five counties in the northwest corner of the state. Aggressive development programs in the Athens and Geneva gas fields of Crawford County have provided substantial amounts of geological and engineering data in the way of cores, samples, and geochemical and geophysical logs. This information is integrated and interpreted in the Pennsylvania Geological Survey's Mineral Resource Report 85, *Petrology and Reservoir Characteristics of the Lower Silurian Medina Group Sandstones, Athens and Geneva Fields, Crawford County, Pennsylvania,* by Christopher D. Laughrey.

This investigation concerns the distribution of depositional environments in the Medina Group reservoir sandstones and the relationship between these environments and reservoir porosity and permeability. In addition, the diagenetic history of the sandstones is outlined, the various effects of diagenesis on reservoir quality and geophysical-log response are determined, and the sensitivity of the Medina Group sandstones to drilling, completion, and stimulation fluids of different compositions is discussed. The report is liberally illustrated with thin-section and scanning-electron-microscope photomicrographs which clearly document the various kinds of grains, cements, clays, and pores that make up the Medina reservoir rocks. Various aspects of geophysical-log-interpretation problems are portrayed graphically. The results of two core analyses and 156 geophysical-log analyses are listed. This report should be of extensive use to all who are engaged in hydrocarbon exploration, development, and research in Pennsylvania and adjacent states.

SUMMARIZED RECORDS OF REPORTED DEEP WELLS[1] IN 1984

by Christopher D. Laughrey, Cheryl L. Cozart, and Robert M. Harper

The information shown in Figure 35 was compiled mainly from drillers' logs, location plats, and geophysical logs received from the Bureau of Oil and Gas Management, as well as personal communication with oil and gas operators. Well records are

Figure 34. *Types of mechanical logs and abbreviations.*

Caliper	CAL
Cement bond log (seismic spectrum)	CBL/SS
Continuous directional	CDR
Compensated neutron	CNL
Density borehole compensated	DBC
Dual laterolog	DLL
Electromagnetic propagation log	EPT
Formation density/gamma ray	FDC/GR
Guard	GD
Gamma ray	GR
High-resolution continuous dipmeter	HDT
Induction log	IL
Laserlog	Laser
Litho density	LTD
Perforating collar log	PCL
Sibilation	S
Sonic	SON
Gas detection stratalog	STRATA
Temperature	T
3-D velocity	3-D VEL
Radioactive tracer	Tracer
Variable density log	VDL

[1]Wells that penetrate rocks of Middle Devonian or older age.

filed with the Bureau of Oil and Gas Management by permit numbers. The Oil and Gas Geology Division, Bureau of Topographic and Geologic Survey, files the records in order by county, 7½-minute topographic map, and permit number. The Division used to assign a file number separate from the permit number, and these file numbers appear on many of the open-file reports and published maps of the Survey. However, this action was abandoned in January 1982, and all well records are henceforth referred to by permit number.

Most of the formation tops and total depths recorded in Figure 35 were picked from mechanical logs of many varieties (see Figure 34 for lists of these logs and their abbreviations). The logs received for a particular well are listed in Figure 35 along with the logged interval. Lack of this information indicates that no mechanical logs were received and formation picks were taken directly from the drillers' logs. The tables are listed alphabetically by county and numerically by permit number.

Figure 35. Summarized records of reported deep wells in 1984 that penetrated rocks of Middle Devonian or older age.

COUNTY Permit Number	Clearfield 21634	Clearfield 21739	Crawford 21792	Crawford 21887	Crawford 21916	Crawford 21917	Crawford 21918	Crawford 21956	Crawford 21959	Crawford 21972
NAME OF WELL	Commonwealth of PA Tract 324, #2	Commonwealth of PA Tract 324, #3	E. & A. Potter #1	Darrel Brickner #1	W. J. Hyde #2	A. T. Boban #2	Wanda S. Worden #1	Edward Nosko #2	Clifford Troyer #1	William Henning #3
OPERATOR	Adobe Oil & Gas Corporation	Adobe Oil & Gas Corporation	Northwest Natural Gas Company	Cardinal Oil Company #31	Meridian Oil & Gas Enterprises, Inc.	Meridian Oil & Gas Enterprises, Inc.	Meridian Oil & Gas Enterprises, Inc.	Meridian Exploration #701	Meridian Exploration #670	Meridian Exploration #699
TOWNSHIP	Girard	Girard	Spring	Beaver	Spring	Beaver	Beaver	Rockdale	Rockdale	Rockdale
QUADRANGLE	The Knobs	The Knobs	Beaver Center	Beaver Center	Beaver Center	Beaver Center	Beaver Center	Cambridge Springs	Miller's Station	Cambridge Springs
LATITUDE	13,200 ft. S 41°12'30"	13,350 ft. S 41°12'30"	10,000 ft. S 41°52'30"	1,800 ft. S 41°47'30"	3,840 ft. S 41°50'00"	8,200 ft. S 41°50'00"	11,020 ft. S 41°47'30"	12,150 ft. S 41°50'00"	8,950 ft. S 41°50'00"	15,000 ft. S 41°50'00"
LONGITUDE	4,900 ft. W 78°17'30"	7,050 ft. W 78°17'30"	1,800 ft. W 80°22'30"	10,760 ft. W 80°22'30"	7,440 ft. W 80°22'30"	10,660 ft. W 80°22'30"	10,700 ft. W 80°25'00"	6,550 ft. W 80°00'00"	7,200 ft. W 79°57'30"	1,250 ft. W 80°00'00"
DATE COMPLETED	9-19-83	3-26-84	5-25-83	11-28-82	12-19-82	12-22-82	12-13-82	7-12-83	11-15-83	7-27-83
ELEVATION	2115 GR	2089 GR	1020 GR	1054 GR	921 GR	1025 GR	1126 GR	1140 GR	1140 GR	1150 GR
LOGS RECEIVED AND LOGGED INTERVALS	GR/CNL: 4000-7590 LTO: 4000-7590 OIL: 4000-7590 GR/T: 1620-7590	T/DBC/CNL: 0-7572 IL/GR: 1700-7572		GR: 3200-3792 DBC/GR: 2050-3536	GR/OBC: 200-3575 GR: 3300-3563 GO: 3300-3570	GR: 3430-3662 OBC: 200-3677	FOC/GR: 200-3866 GR: 3620-3837 GO: 3600-3862	DLL/LL: 19-4235 DBC: 2220-4238	OBC/CNL: 2201-4246 PCL: 3993-4064	GR/DBC: 22-4268
TULLY	6580-	6550-	1970-2010	2110-				2480-	2504-	2508-
ONONDAGA LIMESTONE	7400-	7328-	2138-	2274-	2084-	2200-	2382-	2694-	2722-	2726-
ONONDAGA CHERT			-2332							
ORISKANY	Ridgeley 7442-	Ridgeley 7373-		2504-	2344-	2447-				
HELDERBERG KEYSER-BASS ISLANDS	7449-	7381-	2332-2386	2519-	2358-	2462-	2596-	2884-	2905-	2910-
SALINA GUELPH-LOCKPORT			2386-3010 3010-3287	2578- 3206-	2412- 3022-	2522- 3108-	2673- 3314-	2950- 3532-	2976- 3588-	2978- 3525-
CLINTON IRONDEQUOIT			3287- -3380	3426- 3494-	3254- 3325-	3380- 3445-	3548- 3618-	3836- 3920-	3832- 3914-	3842- 3927-
MEDINA GRIMSBY WHIRLPOOL			3380-	3528- 3692-	3357- 3490-	3480- 3652-	3651- 3817-	3974- 4124-	3954- 4120-	3972- 4133-
QUEENSTON				3700-	3537-	3660-	3832-	4135-	4134-	4145-
PRODUCING FORMATION	Ridgeley	Ridgeley	Medina	Medina	Medina	Medina	Medina	Medina	Medina	Medina
PRODUCING INTERVAL	7444-7449	7375-7379	3430-3470	3552-3648	3407-3434	3535-3558	3695-3766	3989-4131	3993-4064	4012-4171
TOTAL DEPTH	7600	7572	3496	3826	3580	3685	3868	4240	4252	4270
DEEPEST FORMATION REACHED	Helderberg	Helderberg	Medina	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston
RESULTS	2,265 Mcf AF 3,850 psi/72 hrs. development Gifford Run field	3,425 Mcf AF 3,840 psi/120 hrs. development Gifford Run field	1,100 Mcf AF 980 psi/48 hrs development Lundys Lane pool Conneaut field	231 Mcf AF 1,100 psi/48 hrs. development Indian Springs pool Conneaut field	890 Mcf AF 1,125 psi/72 hrs. development Stone Run pool Conneaut field	960 Mcf AF 1,135 psi/72 hrs. development Stone Run pool Conneaut field	1,382 Mcf AF 1,000 psi/72 hrs. development Indian Springs pool Conneaut field	62 Mcf Nat. 238 Mcf AF 1,175 psi/192 hrs. development Cambridge pool Cambridge field	692 Mcf AF 1,170 psi/264 hrs. development Rockdale field	354 Mcf AF 1,125 psi/168 hrs. development Rockdale field

COUNTY Permit Number	Crawford 21973	Crawford 21975	Crawford 21976	Crawford 21977	Crawford 21978	Crawford 21979	Crawford 21980	Crawford 21981	Crawford 21982	Crawford 21983
NAME OF WELL	Mildred R. Merry #4	Beulah Muir #1	Harold Knapp #1	T. E. Hutchinson #1	Charles & Vernon Knapp #1	Donald J. Pier #1	Richard E. Henton #2	Karl L. Bruckner #1	Earl A. Baccus #1	John Watson #1
OPERATOR	Wainoco Oil & Gas Company #W-207A	Wainoco Oil & Gas Company #W-153A	Wainoco Oil & Gas Company #W-157A	Wainoco Oil & Gas Company #W-133A	Wainoco Oil & Gas Company #W-178A	Wainoco Oil & Gas Company #W-172A	Wainoco Oil & Gas Company #W-181A	Wainoco Oil & Gas Company #W-197A	Wainoco Oil & Gas Company #W-199A	Wainoco Oil & Gas Company #W-155A
TOWNSHIP	Rome	Rome	Rome	Rome	Rome	Rome	Rome	Rome	Rome	Rome
QUADRANGLE	Titusville North	Titusville North	Titusville North	Spartansburg	Titusville North	Spartansburg	Spartansburg	Spartansburg	Spartansburg	Titusville North
LATITUDE	9,850 ft. S 41°45'00"	15,100 ft. S 41°45'00"	4,350 ft. S 41°42'30"	11,800 ft. S 41°47'30"	4,050 ft. S 41°42'30"	11,700 ft. S 41°47'30"	10,450 ft. S 41°47'30"	10,500 ft. S 41°47'30"	14,700 ft. S 41°47'30"	8,900 ft. S 41°45'00"
LONGITUDE	2,650 ft. W 79°40'00"	4,000 ft. W 79°37'30"	3,900 ft. W 79°40'00"	2,650 ft. W 79°40'00"	10,100 ft. W 79°40'00"	7,500 ft. W 79°37'30"	600 ft. W 79°37'30"	4,750 ft. W 79°40'00"	10,800 ft. W 79°37'30"	1,050 ft. W 79°37'30"
DATE COMPLETED	8-26-83	9-1-83	9-8-83	9-5-83	9-14-83	8-20-83	9-21-83	9-15-83	8-27-83	8-12-83
ELEVATION	1640 GR	1670 GR	1640 GR	1710 GR	1620 GR	1740 GR	1740 GR	1655 GR	1770 GR	1620 GR
LOGS RECEIVED AND LOGGED INTERVALS	GR/DBC: 0-5426 GR/LL: 700-5422	GR/DBC: 0-5518 GR/LL: 0-5511	GR/DBC: 0-5551 GR/LL: 0-5551	GR/DBC: 0-5366 GR/LL: 0-5366	GR/DBC: 0-5490 GR/LL: 700-5490	GR/DBC: 0-5430 GR/LL: 0-5430	GR/DBC: 0-5460 GR/LL: 650-5450	GR/DBC: 0-5306 GR/LL: 600-5300	GR/DBC: 0-5460 GR/LL: 0-5460	GR/DBC: 0-5461 GR/LL: 0-5461
TULLY	3585-	3648-	3669-	3578-	3602-	3610-	3612-	3504-	3660-	3618-
ONONDAGA LIMESTONE CHERT	3834-	3900-	3924-	3823-	3850-	3862-	3872-	3750-	3910-	3882-
ORISKANY		4044-	4070-			4011-				
HELDERBERG KEYSER-BASS ISLANDS	3981-	4054-	4082-	3980-	3998-	4028-	4015-	3914-	4057-	4016-
SALINA GUELPH-LOCKPORT	4054- 4712-	4118- 4752-	4152- 4786-	4038- 4654-	4078- 4749-	4074- 4696-	4076- 4738-	3988- 4588-	4122- 4750-	4086- 4744-
CLINTON IRONDEQUOIT	4996- 5058-	5062- 5128-	5090- 5154-	4904- 5001-	5026- 5094-	5000- 5058-	5014- 5080-	4830- 4924-	5010- 5098-	5028- 5096-
MEDINA GRIMSBY WHIRLPOOL	5112- 5272-	5180- 5342-	5208- 5370-	5054- 5208-	5148- 5310-	5110- 5264-	5122- 5292-	4973- 5132-	5154- 5306-	5150- 5310-
QUEENSTON	5283-	5356-	5382-	5228-	5322-	5278-	5304-	5153-	5320-	5324-
PRODUCING FORMATION	Medina	Medina	Medina	Medina	Medina	Medina	Medina	Medina	Medina	Medina
PRODUCING INTERVAL	5159-5277	5259-5352	5248-5378	5109-5223	5185-5318	5197-5275	5186-5299	5031-5145	5200-5312	5202-5320
TOTAL DEPTH	5430	5522	5554	5369	5496	5435	5464	5311	5468	5461
DEEPEST FORMATION REACHED	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston
RESULTS	267 Mcf AF 1,330 psi/72 hrs. development Vrooman pool Church Run field	1,400 Mcf AF 1,280 psi/72 hrs. development Rome pool Athens field	280 Mcf AF 1,340 psi/72 hrs. development Vrooman pool Church Run field	696 Mcf AF 1,220 psi/72 hrs. development Rome pool Athens field	933 Mcf AF 1,350 psi/72 hrs. development Rome pool Athens field	381 Mcf AF 1,110 psi/72 hrs. development Hatchtown pool Church Run field	5,180 Mcf AF 1,180 psi/72 hrs. development Hatchtown pool Church Run field	793 Mcf AF 1,300 psi/72 hrs. development Rome pool Athens field	746 Mcf AF 1,305 psi/72 hrs. development Hatchtown pool Church Run field	1,235 Mcf AF 1,320 psi/72 hrs development Vrooman pool Church Run field

Figure 35. *(Continued).*

COUNTY Permit Number	Crawford 21984	Crawford 21985	Crawford 21986	Crawford 21987	Crawford 21990	Crawford 21991	Crawford 21992	Crawford 21993	Crawford 21995	Crawford 21996
NAME OF WELL	Nina Moore Hamrick #1	James A. Kerr #1	Merlin Kunz #2	Raymond W. McKinney #1	Dwight King #1	George Long #1	R. Miller #1	I. Rose #1	Charles Kolaja #1	Ollie Laughlin Lee Hopkins #1
OPERATOR	Wainoco Oil & Gas Company #W-177A	Wainoco Oil & Gas Company #W-179A	Wainoco Oil & Gas Company #W-163A	Wainoco Oil & Gas Company #W-218A	Wainoco Oil & Gas Company #W-216A	Doran & Associates, #K-V-63	Doran & Associates, #K-V-61	Doran & Associates, #K-V-64	Wainoco Oil & Gas Company #W-219A	Wainoco Oil & Gas Company #W-135A
TOWNSHIP	Rome	Rome	Rome	Sparta	Sparta	Spartansburg	Spartansburg	Spartansburg	Sparta	Rome
QUADRANGLE	Titusville North	Titusville North	Titusville North	Spartansburg	Spartansburg	Spartansburg	Lake Canadohta	Spartansburg	Spartansburg	Spartansburg
LATITUDE	2,600 ft. S 41°42'30"	4,500 ft. S 41°42'30"	7,600 ft. S 41°45'00"	700 ft. S 41°47'30"	1,550 ft. S 41°47'30"	1,150 ft. S 41°50'00"	12,900 ft. S 41°52'30"	10,200 ft. S 41°52'30"	700 ft. S 41°47'30"	10,100 ft. S 41°47'30"
LONGITUDE	8,350 ft. W 79°40'00"	8,900 ft. W 79°37'30"	10,500 ft. W 79°40'00"	2,150 ft. W 79°42'30"	8,050 ft. W 79°40'00"	2,600 ft. W 79°42'30"	2,500 ft. W 79°45'00"	9,100 ft. W 79°42'30"	7,400 ft. W 79°37'30"	5,500 ft. W 79°37'30"
DATE COMPLETED	8-13-83	8-6-83	8-19-83	7-30-83	7-24-83	8-14-84	8-5-83	8-11-83	8-2-83	9-25-83
ELEVATION	1625 GR	1510 GR	1505 GR	1460 GR	1360 GR	1595 GR	1630 GR	1655 GR	1470 GR	1730 GR
LOGS RECEIVED AND LOGGED INTERVALS	GR/DBC: 0-5473 GR/LL: 700-5473	GR/DBC: 0-5427 GR/LL: 0-5427	GR/DBC: 650-5244 GR/LL: 0-5244	GR/DBC: 0-4940	GR/DBC: 0-4875 GR/LL: 620-4860	GR/DBC: 2991-4988 OIL/LL: 2992-4989 Laser: 4550-4850	GR/DBC: 2842-4892 DIL/LL: 2846-4892 Laser: 4574-4775	GR/DBC: 2887-4884 OIL/LL: 2886-4884 Laser: 4585-4800	GR/DBC: 0-4948 GR/LL: 594-4920	GR/DBC: 0-5403 GR/LL: 587-5403
TULLY		3550-	3384-	3136-	3094-	3182-	3148-	3174-	3216-	3588-
ONONDAGA LIMESTONE CHERT	3850-	3816-	3630-	3386-	3340-	3426-	3394-	3422-	3464-	3842-
ORISKANY	4000-	3952-						3600-		
HELDERBERG KEYSER-BASS ISLANDS	4010-	3972-	3812-	3538-	3508-	3594-	3574-	3614-	3623-	3992-
SALINA GUELPH-LOCKPORT	4086- 4752-	4082- 4710-	3880- 4489-	3594- 4234-	3572- 4178-	3652- 4269-	3630- 4216-	3665- 4244-	3697- 4317-	4056- 4700-
CLINTON IRONDEQUOIT	5030- 5098-	4990- 5058-	4782- 4846-	4469- 4568-	4414- 4512-	4500- 4600-	4486- 4546-	4504- 4570-	4606- 4668-	4977- 5044-
MEDINA GRIMSBY WHIRLPOOL	5152- 5326-	5104- 5272-	4898- 5061-	4616- 4773-	4562- 4718-	4650- 4806-	4590- 4754-	4614- 4672-	4720- 4877-	5096- 5254-
QUEENSTON		5284-	5072-	4790-	4730-	4818-	4766-	4787-	4890-	5266-
PRODUCING FORMATION	Medina	Medina	Medina	Medina	Medina	Medina	Medina	Medina	Medina	Medina
PRODUCING INTERVAL	5222-5327	5175-5280	4933-5070	4655-4784	4597-4727	4680-4758	4639-4759	4672-4783	4775-4887	5152-5260
TOTAL DEPTH	5477	5441	5244	4949	4882	4990	4908	4947	4930	5415
DEEPEST FORMATION REACHED	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston
RESULTS	1,032 Mcf AF 1,000 psi/72 hrs. development Rome pool Athens field	267 Mcf AF 1,380 psi/72 hrs. development Vrooman pool Church Run field	4,992 Mcf AF 1,220 psi/72 hrs. development Rome pool Athens field	1300 Mcf AF 1,335 psi/240 hrs. extension Brimstone pool Athens field	267 Mcf AF 1,335 psi/72 hrs. development Rome pool Athens field	119 Mcf AF 1,125 psi/72 hrs. extension Dutch Hill pool Athens field	327 Mcf AF 1,070 psi/72 hrs. extension Dutch Hill pool Athens field	60 Mcf AF 1,050 psi/72 hrs. extension Dutch Hill pool Athens field	696 Mcf AF 1,330 psi/72 hrs. extension Eastman Hill pool Sparta field	933 Mcf AF 1,230 psi/72 hrs. development Hatchtown pool Church Run field

COUNTY Permit Number	Crawford 21997	Crawford 21998	Crawford 21999	Crawford 22000	Crawford 22001	Crawford 22002	Crawford 22004	Crawford 22005	Crawford 22006	Crawford 22007
NAME OF WELL	B. Berky #1	Bloomfield Unit #1	A. Byler #1	M. Hochstetler #1	G. Long #1	S. Rasey #1	J. Edminster #1	Homer Barber #1	G. Blair #1	Ira Walton #1
OPERATOR	Doran & Associates, #K-V-59	Doran & Associates, #K-V-62	Doran & Associates, #K-V-55	Doran & Associates #K-V-56	Doran & Associates, #K-V-60	Doran & Associates, # K-V-57	Meridian Exploration #676	Meridian Exploration #668	Meridian Exploration #677	Meridian Exploration #671
TOWNSHIP	Sparta	Sparta	Sparta	Sparta	Sparta	Sparta	Rockdale	Rockdale	Rockdale	Rockdale
QUADRANGLE	Spartansburg	Spartansburg	Spartansburg	Spartansburg	Spartansburg	Spartansburg	Miller's Station	Miller's Station	Miller's Station	Miller's Station
LATITUDE	7,950 ft. S 41°50'00"	11,150 ft. S 41°50'00"	5,700 ft. S 41°50'00"	6,900 ft. S 41°50'00"	10,050 ft. S 41°50'00"	12,650 ft. S 41°50'00"	6,800 ft. S 41°47'30"	2,950 ft. S 41°47'30"	5,400 ft. S 41°47'30"	4,700 ft. S 41°50'00"
LONGITUDE	4,750 ft. W 79°40'00"	10,100 ft. W 79°42'30"	4,750 ft. W 79°42'30"	8,250 ft. W 79°42'30"	4,850 ft. W 79°42'30"	8,700 ft. W 79°37'30"	1,000 ft. W 79°55'00"	50 ft. W 79°55'00"	8,200 ft. W 79°55'00"	9,400 ft. W 79°55'00"
DATE COMPLETED	8-9-83	8-14-83	7-28-83	8-1-83	8-7-83	8-1-83	8-4-83	9-24-83	8-15-83	8-22-83
ELEVATION	1475 GR	1410 GR	1620 GR	1620 GR	1640 GR	1665 GR	1410 GR	1620 GR	1175 GR	1380 GR
LOGS RECEIVED AND LOGGED INTERVALS	GR/DBC: 2898-4910 DIL/LL: 2817-4910 Laser: 4580-4746	GR/DBC: 2762-4772 DIL/LL: 2761-4773 CBL: 4400-4740	GR/DBC: 3302-4990 DIL/LL: 3300-4991 Laser: 4701-4748	DBC: 3040-4978	DBC: 2998-5016	DBC: 3150-5190	DBC: 35-4683 DI/LL: 2508-4676	DBC: 441-4840 DI/LL: 2832-4840	GR/DBC: 2285-4390 DI/LL: 2300-4392 T: 2180-3910 CBL: 2600-4304	GR/DBC: 2450-4455 LL: 2450-4455
TULLY	3170-	3040-		3214-	3294-	3410-	2916-	3126-	2660-	2756-
ONONDAGA LIMESTONE CHERT	3412-	3280-	3448-	3458-	3538-	3658-	3140-	3352-	2878-	2981-
ORISKANY				3636-	3706-					
HELDERBERG KEYSER-BASS ISLANDS	3576-	3450-	3627-	3652-	3722-	3816-	3318-	3533-	3058-	3164-
SALINA GUELPH-LOCKPORT	3640- 4258-	3504- 4128-	3694- 4298-	3700- 4294-	3768- 4384-	3872- 4510-	3376- 4004-	3591- 4211-	3118- 3744-	3219- 3826-
CLINTON IRONDEQUOIT	4523- 4586-	4402- 4462-	4570- 4632-	4547- 4630-	4618- 4716-	4783- 4848-	4279- 4338-	4486- 4546-	4017- 4074-	4096- 4152-
MEDINA GRIMSBY WHIRLPOOL	4636- 4792-	4510- 4668-	4680- 4840-	4676- 4832-	4764- 4921-	4898- 5054-	4388- 4549-	4599- 4754-	4116- 4281-	4188- 4356-
QUEENSTON	4803-	4686-	4854-	4848-	4934-	5071-	4566-	4766-	4297-	4368-
PRODUCING FORMATION	Medina	Medina	Medina	Medina	Medina	Medina	Medina	Medina	Medina	Medina
PRODUCING INTERVAL	4684-4793	4547-4676	4770-4842	4738-4838	4817-4926	4925-5058	4415-4459	4631-4759	4152-4233	4226-4277
TOTAL DEPTH	4951	4803	5025	5034	5097	5232	4686	4856	4393	4466
DEEPEST FORMATION REACHED	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston
RESULTS	133 Mcf AF 1,175 psi/72 hrs. extension Eastman Hill pool Sparta field	100 Mcf AF 1,070 psi/72 hrs. development Dutch Hill pool Athens field	90 Mcf AF 1,100 psi/72 hrs. extension Dutch Hill pool Athens field	411 Mcf AF 1,040 psi/72 hrs. development Dutch Hill pool Athens field	400 Mcf AF 1,050 psi/72 hrs. extension Dutch Hill pool Athens field	310 Mcf AF 1,050 psi/72 hrs. development Eastman Hill pool Sparta field	60 Mcf Nat. 825 Mcf AF 1,225 psi/168 hrs. development Brown Hill pool Eaton Corners field	50 Mcf Nat. 120 Mcf AF 1,050 psi/168 hrs. development Brown Hill pool Eaton Corners field	75 Mcf Nat. 612 Mcf AF 1,200 psi/168 hrs. development Brown Hill pool Eaton Corners field	304 Mcf AF 1,200 psi/192 hrs. development Rockdale field

Figure 35. *(Continued).*

COUNTY Permit Number	Crawford 22008	Crawford 22009	Crawford 22010	Crawford 22011	Crawford 22012	Crawford 22014	Crawford 22015	Crawford 22017	Crawford 22018	Crawford 22019
NAME OF WELL	William Lenox #1	Shields & Seymour #1	R. Gourley #1	R. Gourley #2	William Lenox #1	Bunting #1	Albert Shields #1	Edminster #2	R. H. Gourley #1	Bunting (Sherred) #1
OPERATOR	Meridian Exploration #667	Mitch-Well Energy, Incorporated	Meridian Exploration #675	Meridian Exploration #715	Meridian Exploration #669	Meridian Exploration #714	Mitch-Well Energy, Incorporated	Meridian Exploration #709	Meridian Exploration #674	Meridian Exploration #710
TOWNSHIP	Rockdale	Bloomfield	Rockdale	Rockdale	Rockdale	Rockdale	Bloomfield	Rockdale	Rockdale	Rockdale
QUADRANGLE	Miller's Station	Lake Canadohta	Miller's Station	Miller's Station	Miller's Station	Miller's Station	Lake Canadohta	Miller's Station	Miller's Station	Miller's Station
LATITUDE	8,700 ft. S 41°47'30"	14,250 ft. S 41°50'00"	8,250 ft. S 41°50'00"	7,300 ft. S 41°50'00"	7,050 ft. S 41°47'30"	1,100 ft. S 41°45'00"	14,200 ft. S 41°50'00"	8,400 ft. S 41°47'30"	6,550 ft. S 41°50'00"	11,750 ft. S 41°50'00"
LONGITUDE	5,950 ft. W 79°55'00"	2,650 ft. W 79°47'30"	850 ft. W 79°55'00"	10,000 ft. W 79°52'30"	7,450 ft. W 79°55'00"	2,100 ft. W 79°57'30"	4,350 ft. W 79°47'30"	1,450 ft. W 79°55'00"	1,200 ft. W 79°55'00"	300 ft. W 79°57'30"
DATE COMPLETED	8-1-83	9-15-83	9-10-83	10-22-83	8-10-83	8-24-83	9-9-83	8-11-83	9-15-83	8-30-83
ELEVATION	1180 GR	1396 GR	1455 GR	1525 GR	1170 GR	1150 GR	1430 GR	1330 GR	1560 GR	1240 GR
LOGS RECEIVED AND LOGGED INTERVALS	GR/OBC: 2450-4452 DI/LL: 2300-4453	GR/DBC: 3000-4744 PCL: 2700-4754	GR/DBC: 421-4630 DI/LL: 2531-4630 GR: 4240-4588	OBC/CNL: 2648-4662 DI/LL: 432-4662	GR/OBC: 2399-4420 OI/LL: 44-4420 T: 2378-3590	GR/DBC: 2315-4313 DI/LL: 566-4314	GR/OBC: 3000-4706	GR/OBC: 2613-4642 OI/LL: 34-4642	GR/OBC: 2649-4666 OI/LL: 2650-4666	GR/OBC: 424-4371 OI/LL: 2211-4345
TULLY	2710-	3006-	2892-	2962-	2686-	2570-	3010-	2868-	2960-	2642-
LIMESTONE ONONDAGA CHERT	2928-	3242-	3122-	3190-	2906-	2790-	3246-	3088-	3188-	2862-
ORISKANY				3272-						
HELDERBERG KEYSER-BASS ISLANDS	3106-	3414-	3302-	3390-	3088-	2972-	3420-	3264-	3370-	3045-
SALINA GUELPH-LOCKPORT	3166- 3806-	3469- 4077-	3364- 3978-	3432- 4030-	3146- 3774-	3034- 3666-	3476- 4096-	3320- 3965-	3435- 4038-	3112- 3702-
CLINTON IRONDEQUOIT	4074- 4132-	4350-	4220- 4310-	4298- 4358-	4050- 4108-	3933- 3990-	4348- 4431-	4197- 4298-	4278- 4364-	3976- 4060-
MEDINA GRIMSBY WHIRLPOOL	4177- 4342-	4475- 4638-	4352- 4514-	4398- 4560-	4149- 4318-	4030- 4196-	4476- 4634-	4340- 4504-	4405- 4570-	4100- 4266-
QUEENSTON	4362-	4654-	4528-	4574-	4330-	4212-	4652-	4522-	4585-	4278-
PRODUCING FORMATION	Medina	Medina	Medina	Medina	Medina	Medina	Medina	Medina	Medina	Medina
PRODUCING INTERVAL	4243-4289	4511-4575	4390-4463	4447-4522	4191-4247	4061-4128	4542-4637	4375-4514	4461-4513	4140-4211
TOTAL DEPTH	4454	4785	4644	4673	4422	4325	4842	4644	4696	4363
DEEPEST FORMATION REACHED	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston
RESULTS	88 Mcf Nat. 700 Mcf AF 1,200 psi/168 hrs. development Brown Hill pool Eaton Corners field	2,756 Mcf AF 1,260 psi/48 hrs. development Lincolnville pool Athens field	119 Mcf AF 1,225 psi/168 hrs. development Rockdale field	125 Mcf AF 1,130 psi/504 hrs. development Rockdale field	163 Mcf AF 750 psi/192 hrs. development Brown Hill pool Eaton Corners field	158 Mcf AF 1,220 psi/168 hrs. development Brown Hill pool Eaton Corners field	3,106 Mcf AF 1,180 psi/48 hrs. development Lincolnville pool Athens field	60 Mcf Nat. 378 Mcf AF 1,175 psi/336 hrs. development Brown Hill pool Eaton Corners field	163 Mcf AF 1,150 psi/288 hrs. development Rockdale field	47 Mcf Nat. 269 Mcf AF 990 psi/336 hrs. development Rockdale field

COUNTY Permit Number	Crawford 22020	Crawford 22021	Crawford 22022	Crawford 22023	Crawford 22024	Crawford 22025	Crawford 22026	Crawford 22027	Crawford 22028	Crawford 22029
NAME OF WELL	Merle Bunting #2	A. T. Boban #3	W. J. Hyde #1	W. J. Hyde #2	A. Glenn #1	A. Mitchell #1	Greig #1	J. Zadorozny #1	Lucas #1	J. Mook #1
OPERATOR	Meridian Exploration #680	Meridian Oil & Gas Enterprises, Inc.	Meridian Oil & Gas Enterprises, Inc.	Meridian Oil & Gas Enterprises, Inc.	Meridian Exploration #716	Mitchell Energy Corporation	Mitchell Energy Corporation	Mitchell Energy Corporation	Mitchell Energy Corporation	Mitchell Energy Corporation
TOWNSHIP	Rockdale	Beaver	Beaver	Beaver	Richmond	Cussewago	Conneaut	Cussewago	West Shenango	Cussewago
QUADRANGLE	Miller's Station	Beaver Center	Beaver Center	Beaver Center	Miller's Station	Edinboro South	Linesville	Edinboro South	Greenville West	Edinboro South
LATITUDE	12,450 ft. S 41°50'00"	8,180 ft. S 41°50'00"	10,600 ft. S 41°50'00"	9,500 ft. S 41°50'00"	11,000 ft. S 41°37'30"	12,000 ft. S 41°50'00"	2,950 ft. S 41°42'30"	3,525 ft. S 41°50'00"	6,575 ft. S 41°30'00"	3,000 ft. S 41°47'30"
LONGITUDE	1,650 ft. W 79°57'30"	9,180 ft. W 80°22'30"	620 ft. W 80°25'00"	9,240 ft. W 80°22'30"	10,000 ft. W 79°52'30"	600 ft. W 80°10'00"	4,400 ft. W 80°25'00"	11,100 ft. W 80°07'30"	3,975 ft. W 80°27'30"	3,200 ft. W 80°10'00"
DATE COMPLETED	8-31-83	9-28-83	9-16-83	9-22-83	1-6-84	9-8-83	9-22-83	9-1-83	9-16-83	9-8-83
ELEVATION	1210 GR	1022 GR	1007 GR	1034 GR	1250 GR	1430 GR	1150 GR	1476 GR	1068 GR	1411 GR
LOGS RECEIVED AND LOGGED INTERVALS	GR/OBC: 2325-4346 OI/LL: 41-4342	FOC/GR: 250-3734 GO: 3400-3730 GR: 3400-3710	FDC/GR: 250-3692 GR: 3400-3677 GD: 3300-3688	FDC/GR: 250-3732 GO: 3350-3730 GR: 3450-3715	DBC/CNL: 2547-4560 OI/LL: 437-4560	GR: 2200-4278	GR: 2050-4051	GR: 2300-4307	DBC: 2481-4540	GR: 4000-4305
TULLY	2606-				2800-	2650-	2337-	2616-	2608-	2653-
ONONDAGA LIMESTONE CHERT	2826-	2202-	2172-	2220-	3022-	2848-	2488-	2820-	2802-	2844-
ORISKANY		2444-	2420-	2468-				3046-3050?		
HELDERBERG KEYSER-BASS ISLANDS	3009-	2456-	2432-	2476-	3202-	3050-	2698-	3050-	3026-	3038-
SALINA GUELPH-LOCKPORT	3076- 3704-	2520- 3144-	2500- 3130-	2552- 3150-	3260- 3912-	3117- 3704-	2806- 3484-	3117- 3684-	3124- 3894-	3107- 3713-
CLINTON IRONDEQUOIT	3968- 4024-	3366- 3449-	3356- 3432-	3404- 3462-	4144- 4244-	3992- 4045-	3724- 3797-	3985- 4039-	4132- 4215-	4001- 4056-
MEDINA GRIMSBY WHIRLPOOL	4063- 4230-	3482- 3653-	3455- 3628-	3508- 3667-	4255- 4450-	4077- 4252-	3836- 4008-	4076- 4188-	4266- 4450-	4095- 4266-
QUEENSTON	4242-	3661-	3649-	3690-	4465-	4262-	4017-	4198-	4460-	4274-
PRODUCING FORMATION	Medina	Medina	Medina	Medina	Medina	Medina	Medina	Medina	Medina	Medina
PRODUCING INTERVAL	4111-4171	3539-3570	3491-3534	3576-3637	4357-4399	4186-4257	3856-4015	4080-4250	4294-4456	4096-4270
TOTAL DEPTH	4359	3740	3690	3723	4562	4328	4118	4353	4549	4400
DEEPEST FORMATION REACHED	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston
RESULTS	75 Mcf Nat. 194 Mcf AF 1,130 psi/168 hrs. development Rockdale field	547 Mcf AF 1,100 psi/128 hrs. development Stone Run pool Conneaut field	892 Mcf AF 1,110 psi/168 hrs. development Stone Run pool Conneaut field	541 Mcf AF 1,150 psi/168 hrs. development Stone Run pool Conneaut field	189 Mcf AF 1,170 psi/144 hrs. development. Brown Hill pool Eaton Corners field	485 Mcf AF 1,040 psi/250 hrs. extension Kastle pool Conneaut field	508 Mcf AF 1,245 psi/115 hrs. development Blood pool Conneaut field	510 Mcf AF 1,200 psi/139 hrs. development Cussewago field	628 Mcf AF 1,190 psi/190 hrs. extension Jamestown field	490 Mcf AF 1,150 psi/162 hrs. development Kastle pool Conneaut field

Figure 35. *(Continued).*

COUNTY Permit Number	Crawford 22030	Crawford 22031	Crawford 22032	Crawford 22033	Crawford 22034	Crawford 22035	Crawford 22038	Crawford 22039	Crawford 22040	Crawford 22041
NAME OF WELL	Yurcak #1	Model Land #1	J. Scullen #1	J. Speck #1	Higgins #1	C. Snyder #1	S. McMichael #1	P. Holland #1	Brown #1	Schlosser #1
OPERATOR	Mitchell Energy Corporation	Mitchell Energy Corporation	Mitchell Energy Corporation	Mitchell Energy Corporation	Mitchell Energy Corporation	Mitchell Energy Corporation	Envirogas, Incorporated	Meridian Exploration #713	Mitchell Energy Corporation	Mitchell Energy Corporation
TOWNSHIP	Cussewago	Cussewago	Cussewago	Cussewago	Conneaut	Conneaut	Union	Rockdale	Spring	Cussewago
QUADRANGLE	Edinboro South	Edinboro South	Edinboro South	Edinboro South	Linesville	Linesville	Geneva	Miller's Station	Conneautville	Edinboro South
LATITUDE	7,650 ft. S 41°50'00"	11,500 ft. S 41°52'30"	12,225 ft. S 41°50'00"	7,150 ft. S 41°50'00"	8,750 ft. S 41°42'30"	9,325 ft. S 41°42'30"	14,600 ft. S 41°37'30"	8,100 ft. S 41°47'30"	1,900 ft. S 41°50'00"	12,250 ft. S 41°47'30"
LONGITUDE	11,175 ft. W 80°07'30"	1,450 ft. W 80°12'30"	3,325 ft. W 80°12'30"	6,750 ft. W 80°10'00"	9,900 ft. W 80°22'30"	3,275 ft. W 80°25'00"	7,400 ft. W 80°10'00"	10,900 ft. W 79°52'30"	7,420 ft. W 80°15'00"	9,350 ft. W 80°10'00"
DATE COMPLETED	8-25-83	9-11-83	9-17-83	9-8-83	10-5-83	9-29-83	10-4-83	9-9-83	9-20-83	10-6-83
ELEVATION	1420 GR	1270 GR	1148 GR	1148 GR	1179 GR	1137 GR	1130 GR	1380 GR	1226 GR	1284 GR
LOGS RECEIVED AND LOGGED INTERVALS	OBC: 2266-4297	OBC: 2051-4050	GR: 2000-3999	OBC: 2200-4204	GR: 2200-4196	GR: 2200-4180	FDC/GR: 100-4634 OLL: 656-4620	GR/OBC: 2648-4660 OI/LL: 3350-4654 GR: 4300-4600	GR: 1900-3901	OBC/CNL: 2290-4288 OI/LL: 2086-4288
TULLY	2606-	2320-	2304-	2523-	2463-	2412-	2798-	2916-	2278-	2574-
ONONDAGA LIMESTONE CHERT	2813-	2524-	2493-	2720-	2614-	2563-	2974-	3140-	2472-	2760-
ORISKANY		2770-	2691-	2924-	2812-		3164-		2688-	
HELDERBERG KEYSER-BASS ISLANDS	3013-	2774-	2695-	2929-	2817-	2766-	3174-	3317-	2696-	2962-
SALINA GUELPH-LOCKPORT	3080- 3662-	2853- 3464-	2783- 3422-	2996- 3590-	2922- 3604-	2849- 3528-	3260- 3962-	3374- 4010-	2762- 3346-	3032- 3698-
CLINTON IRONDEQUOIT	3930- 4007-	3700- 3773-	3660- 3715-	3846- 3921-	3866- 3918-	3820- 3870-	4256- 4314-	4244- 4343-	3603- 3657-	3958- 4014-
MEDINA GRIMSBY WHIRLPOOL	4058- 4208-	3810- 3974-	3741- 3923-	3958- 4126-	3960- 4135-	3912- 4089-	4364- 4542-	4386- 4553-	3691- 3866-	4040- 4223-
QUEENSTON	4221-	3984-	3933-	4135-	4143-	4097-	4556-	4566-	3873-	4232-
PRODUCING FORMATION	Medina	Medina	Medina	Medina	Medina	Medina	Medina	Medina	Medina	Medina
PRODUCING INTERVAL	4048-4216	3812-3925	3758-3925	3962-4128	3977-4141	3942-4093	4544-4554	4451-4489	3712-3868	4226-4230
TOTAL DEPTH	4299	4052	4040	4208	4210	4190	4637	4668	3972	4310
DEEPEST FORMATION REACHED	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston
RESULTS	287 Mcf AF 750 psi/260 hrs. development Cussewago field	418 Mcf AF 1,050 psi/145 hrs. extension Indian Springs pool Conneaut field	500 Mcf AF 1,185 psi/280 hrs. extension Kastle pool Conneaut field	500 Mcf AF 1,185 psi/190 hrs. extension Cussewago field	570 Mcf AF 1,140 psi/135 hrs. extension Blood pool Conneaut field	675 Mcf AF 1,030 psi/116 hrs. development Blood pool Conneaut field	100 Mcf AF 850 psi/240 hrs. extension Keborts pool Vernon field	44 Mcf Nat. 312 Mcf AF 1,225 psi/168 hrs. development Brown Hill pool Eaton Corners field	488 Mcf AF 1,175 psi/186 hrs. development Indian Springs pool Conneaut field	219 Mcf AF 1,060 psi/72 hrs. development Kastle pool Conneaut field

COUNTY Permit Number	Crawford 22043	Crawford 22044	Crawford 22049	Crawford 22057	Crawford 22058	Crawford 22059	Crawford 22060	Crawford 22061	Crawford 22062	Crawford 22063
NAME OF WELL	Howard Willey #1	Porter #1	R. Laird #2	Moses #1	Moses #2	James Van Meter #1	James Van Meter #2	James Van Meter #1	Luebbert Farms #1	H. Plyler #1
OPERATOR	Meridian Exploration #573	Meridian Exploration #672	Ingram Enterprises, Inc., #W-01	Lakeside Energy, Incorporated	Lakeside Energy, Incorporated	Lakeside Energy, Incorporated	Lakeside Energy, Incorporated	Lakeside Energy, Incorporated	Meridian Exploration #679	Mitchell Energy Corporation
TOWNSHIP	Rockdale	Rockdale	Conneaut	Cussewago	Cussewago	Cussewago	Cussewago	Cussewago	Rockdale	Summit
QUADRANGLE	Miller's Station	Miller's Station	Linesville	Edinboro South	Edinboro South	Edinboro South	Edinboro South	Edinboro South	Miller's Station	Harmonsburg
LATITUDE	12,750 ft. S 41°50'00"	300 ft. S 41°47'30"	2,700 ft. S 41°42'30"	10,780 ft. S 41°50'00"	9,380 ft. S 41°50'00"	9,640 ft. S 41°50'00"	10,560 ft. S 41°50'00"	8,000 ft. S 41°50'00"	10,750 ft. S 41°50'00"	250 ft. S 41°40'00"
LONGITUDE	1,900 ft. W 79°55'00"	1,400 ft. W 79°55'00"	11,180 ft. W 80°25'00"	6,660 ft. W 80°10'00"	6,240 ft. W 80°10'00"	9,460 ft. W 80°10'00"	8,280 ft. W 80°10'00"	9,380 ft. W 80°10'00"	10,000 ft. W 79°52'30"	8,700 ft. W 80°20'00"
DATE COMPLETED	10-30-83	11-5-83	12-1-83	11-22-83	12-3-83	11-28-83	11-18-83	12-7-83	11-10-83	1-24-84
ELEVATION	1515 GR	1585 GR	1138 GR	1349 GR	1370 GR	1247 GR	1310 GR	1315 GR	1445 GR	1189 GR
LOGS RECEIVED AND LOGGED INTERVALS	GR/OBC: 2664-4686 OI/LL: 456-4675	OBC/CNL: 2762-4760 OI/LL: 432-4748 CBL: 3700-4758		OBC/CNL: 2199-4207 GR: 3900-4170 LL: 2193-4204 Laser: 2700-3850		OBC/CNL: 2145-4124 OIL/LL: 2145-4125 Laser: 2770-2900 CBL: 3100-4055	OBC/CNL: 2533-4176 LL: 2529-4173 CBL: 3170-4153 Laser: 2830-3000	OBC/CNL: 2416-4216 LL: 2400-4213 CBL: 3240-4189	CBL: 3600-4540	GR: 2300-4300
TULLY	2970-	3062-	2327-	2534-	2534-	2420-	2480-	2476-		2560-
ONONDAGA LIMESTONE CHERT	3194-	3288-	2484-	2728-	2732-	2616-	2684-	2672-		2720-
ORISKANY	3378-	3473-	2745-?	2929-			2883-	2875-		
HELDERBERG KEYSER-BASS ISLANDS	3396-	3488-	2778-	2933-	2999-	2814-	2910-	2902-		2917-
SALINA GUELPH-LOCKPORT	3438- 4050-	3526- 4132-	2815- 3410-	2998- 3615-	3352- 3591-	2886- 3492-	2956- 3578-	2944- 3546-	3974-	3007- 3680-
CLINTON IRONDEQUOIT	4321- 4380-	4399- 4479-	3682-	3876- 3928-	3884- 3936-	3748- 3828-	3838- 3892-	3798- 3872-	4208- 4294-	3948- 4024-
MEDINA GRIMSBY WHIRLPOOL	4419- 4582-	4519- 4686-	3824-	3954- 4126-	3962-	3853- 4034-	3928- 4096-	3918- 4067-	4318- 4500-	4067- 4242-
QUEENSTON	4598-	4700-	4014-	4140-	4148-	4044-	4104-	4081-	4512-	4254-
PRODUCING FORMATION	Medina	Medina	Medina	Medina	Medina	Medina	Medina	Medina	Medina	Medina
PRODUCING INTERVAL	4465-4583	4567-4636	3860-3946	3990-4066	4012-4059	3910-3946	3978-4057	3960-3996	4406-4452	4087-4252
TOTAL DEPTH	4688	4774	4112	4213	4243	4150	4181	4235	4604	4330
DEEPEST FORMATION REACHED	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston
RESULTS	231 Mcf AF 1,170 psi/168 hrs. development Rockdale field	129 Mcf AF 1,175 psi/504 hrs. development Brown Hill pool Eaton Corners field	1,200 Mcf AF 1,100 psi/96 hrs. development Blood pool Conneaut field	750 Mcf AF 1,250 psi/72 hrs. development Cussewago field	650 Mcf AF 1,225 psi/72 hrs. development Cussewago field	850 Mcf AF 1,250 psi/72 hrs. development Cussewago field	750 Mcf AF 1,275 psi/72 hrs. development Cussewago field	850 Mcf AF 1,275 psi/72 hrs. development Cussewago field	238 Mcf AF 1,160 psi/360 hrs. development Rockdale field	110 Mcf AF 1,310 psi/162 hrs. development Carlson pool Conneaut field

Figure 35. *(Continued).*

COUNTY Permit Number	Crawford 22064	Crawford 22065	Crawford 22067	Crawford 22068	Crawford 22069	Crawford 22070	Crawford 22071	Crawford 22075	Crawford 22077	Crawford 22078
NAME OF WELL	J. McCarthy #1	P. Bauer #1	Handleman #1	A. Bonk #1	William Hale #1	Edward Powell #1	John Perry #1	Sommers #1	Garbart #1	Zarembinski #1
OPERATOR	Mitchell Energy Corporation	Mitchell Energy Corporation	Mitchell Energy Corporation	Mitchell Energy Corporation	Meridian Exploration #720	Meridian Exploration #736	Meridian Exploration #712	Mitchell Energy Corporation	Mitchell Energy Corporation	Mitchell Energy Corporation
TOWNSHIP	Summit	Summerhill	Summerhill	Cussewago	Rockdale	Rockdale	Rockdale	Summerhill	Summit	Summit
QUADRANGLE	Harmonsburg	Harmonsburg	Harmonsburg	Edinboro South	Miller's Station	Miller's Station	Miller's Station	Harmonsburg	Harmonsburg	Harmonsburg
LATITUDE	700 ft. S 41°40'00"	11,850 ft. S 41°45'00"	700 ft. S 41°42'30"	950 ft. S 41°50'00"	9,600 ft. S 41°47'30"	9,300 ft. S 41°47'30"	1,300 ft. S 41°50'00"	5,130 ft. S 41°42'30"	9,750 ft. S 41°42'30"	6,290 ft. S 41°40'00"
LONGITUDE	8,300 ft. W 80°15'00"	10,750 ft. W 80°20'00"	10,750 ft. W 80°20'00"	9,900 ft. W 80°12'30"	2,750 ft. W 79°55'00"	4,150 ft. W 79°57'30"	600 ft. W 79°57'30"	5,950 ft. W 80°15'00"	8,580 ft. W 80°17'30"	4,300 ft. W 80°20'00"
DATE COMPLETED	1-31-84	1-7-84	1-12-84	11-24-83	1-16-84	2-7-84	1-17-84	1-20-84	2-22-84	2-8-84
ELEVATION	1282 GR	1162 GR	1193 GR	1119 GR	1220 GR	1300 GR	1370 GR	1390 GR	1153 GR	1108 GR
LOGS RECEIVED AND LOGGED INTERVALS	LTD/GR: 50-4463 DLL/GR: 2400-4450	GR: 2080-4080	GR: 2200-4214	DBC/CNL: 406-3828 DLL: 406-3814 SON: 406-3818	DBC/CNL: 2498-4494 GR: 4100-4450 DI/LL: 2500-4492	DBC/CNL: 2811-4538 DI/LL: 2510-4539	DBC/CNL: 2399-4435 LL: 2400-4430 GR: 4050-4400	GR: 2520-4520 PCL: 4272-4446	GR: 2200-4284	DBC/CNL: 2268-4278 GR/DLL: 224-4266
TULLY	2706-	2384-	2457-	2162-	2760-		2730-	2770-	2509-	2504-
ONONDAGA LIMESTONE CHERT	2868-	2542-	2614-	2356-	2980-	3010-	2956-	2936-	2683-	2660-
ORISKANY	3064-	2742-	2812-	2574-	3158-		3144-	3130-		2857-
HELDERBERG KEYSER-BASS ISLANDS	3074-	2751-	2822-	2579-	3184-	3185-	3164-	3140-	2890-	2866-
SALINA GUELPH-LOCKPORT	3149- 3852-	2832- 3504-	2900- 3601-	2658- 3255-	3216- 3851-	3254- 3896-	3202- 3804-	3234- 3922-	2969- 3675-	2950- 3659-
CLINTON IRONDEQUOIT	4113- 4168-	3778- 3832-	3840- 3914-	3503- 3559-	4126- 4186-	4156- 4228-	4038- 4122-	4167- 4223-	3941- 3996-	3920- 3976-
MEDINA GRIMSBY WHIRLPOOL	4211- 4386-	3872- 4043-	3954- 4127-	3584- 3762-	4227- 4392-	4274- 4434-	4159- 4322-	4263- 4436-	4037- 4212-	4018- 4197-
QUEENSTON	4397-	4050-	4136-	3772-	4406-	4450-	4334-	4448-	4221-	4206-
PRODUCING FORMATION	Medina	Medina	Medina	Medina	Medina	Medina	Medina	Medina	Medina	Medina
PRODUCING INTERVAL	4237-4395	3893-4048	3973-4132	3597-3769	4271-4330	4341-4370	4197-4238	4272-4446	4063-4219	4043-4204
TOTAL DEPTH	4467	4110	4220	3830	4504	4541	4437	4560	4300	4280
DEEPEST FORMATION REACHED	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston
RESULTS	87 Mcf AF 1,220 psi/236 hrs. extension Carlson pool Conneaut field	96 Mcf AF 1,215 psi/240 hrs. development Indian Springs pool Conneaut field	105 Mcf AF 1,235 psi/494 hrs. development Indian Springs pool Conneaut field	66 Mcf AF 1,170 psi/816 hrs. development Pageville pool Conneaut field	26 Mcf Nat. 222 Mcf AF 1,150 psi/488 hrs. development Brown Hill pool Eaton Corners field	92 Mcf AF 1,230 psi/336 hrs. extension Brown Hill pool Eaton Corners field	133 Mcf AF 1,175 psi/288 hrs. development Rockdale field	105 Mcf AF 1,230 psi/310 hrs. development Indian Springs pool Conneaut field	91 Mcf AF 1,240 psi/345 hrs. development Carlson pool Conneaut field	94 Mcf AF 1,278 psi/288 hrs. development Carlson pool Conneaut field

COUNTY Permit Number	Crawford 22079	Crawford 22080	Crawford 22081	Crawford 22082	Crawford 22083	Crawford 22084	Crawford 22085	Crawford 22088	Crawford 22089	Crawford 22090
NAME OF WELL	Park Golf Course #1	Moertel #1	Clyde Shearer #1	Irma Carpenter #1	E. Candelaria #1	Steven O. Leonard #1	Gerald Crynock #1	E. Sanders #1	E. Sanders #2	Zulovich #1
OPERATOR	Mitchell Energy Corporation	Mitchell Energy Corporation	Mitchell Energy Corporation	Mitchell Energy Corporation	Mitchell Energy Corporation	Mitchell Energy Corporation	N.E.A. Cross Company	Meridian Exploration #738	Meridian Exploration #740	Meridian Exploration #729
TOWNSHIP	Summit	Summerhill	Cussewago	Summit	Summit	Summerhill	LeBoeuf	Venango	Venango	Venango
QUADRANGLE	Harmonsburg	Harmonsburg	Edinboro South	Harmonsburg	Harmonsburg	Linesville	Miller's Station	Cambridge Springs	Cambridge Springs	Edinboro South
LATITUDE	6,900 ft. S 41°40'00"	7,240 ft. S 41°45'00"	11,000 ft. S 41°50'00"	5,800 ft. S 41°42'30"	5,630 ft. S 41°42'30"	14,930 ft. S 41°45'00"	10,350 ft. S 41°52'30"	12,850 ft. S 41°52'30"	13,750 ft. S 41°52'30"	12,550 ft. S 41°52'30"
LONGITUDE	5,800 ft. W 80°17'30"	9,090 ft. W 80°15'00"	8,525 ft. W 80°07'30"	7,660 ft. W 80°15'00"	2,540 ft. W 80°17'30"	4,050 ft. W 80°22'30"	5,050 ft. W 79°55'00"	2,600 ft. W 80°05'00"	1,250 ft. W 80°05'00"	5,600 ft. W 80°07'30"
DATE COMPLETED	2-5-84	1-3-84	2-5-84	2-14-84	2-2-84	1-23-84	1-24-84	2-4-84	2-12-84	1-23-84
ELEVATION	1078 GR	1310 GR	1380 GR	1376 GR	1281 GR	1176 GR	1480 GR	1170 GR	1160 GR	1410 GR
LOGS RECEIVED AND LOGGED INTERVALS	GR: 350-4350	GR: 2300-4302	OBC/CNL: 406-4278 SON: 406-4272 OLL: 406-4255	GR/PCL: 2490-4490	OBC/CNL: 408-4483 OLL: 408-4460 SON: 408-4467	DBC/CNL; 410-4170 OLL: 2168-4156	OBC/CNL: 2501-4514	OBC/CNL: 2113-4128 OI/LL: 2100-4110	OBC/CNL: 1972-4123 OI/LL: 2061-4120 Laser: 3850-4040	DBC/CNL: 2276-4280 OI/LL: 2200-4272
TULLY	2592-	2620-	2586-	2762-	2640-	2398-	2814-	2370-	2376-	2532-
ONONDAGA LIMESTONE CHERT	2764-	2790-	2786-	2930-	2804-	2556-	3045-	2588-	2590-	2752-
ORISKANY	2972-				3002-	2756-	3238-	2822-		
HELDERBERG KEYSER-BASS ISLANDS	2980-	2985-	2980-	3136-	3011-	2766-	3256-	2840-	2822-	2984-
SALINA GUELPH-LOCKPORT	3088- 3772-	3066- 3764-	3054- 3672-	3217- 3916-	3088- 3786-	2846- 3548-	3300- 3892-	2886- 3494-	2887- 3506-	3058- 3654-
CLINTON IRONDEQUOIT	4016- 4097-	4000- 4054-	3934- 3990-	4160- 4220-	4004- 4104-	3788- 3862-	4150- 4220-	3754- 3810-	3768- 3818-	3900- 3980-
MEDINA GRIMSBY WHIRLPOOL	4139- 4316-	4093- 4263-	4014- 4196-	4261- 4438-	4146- 4320-	3902- 4070-	4244- 4420-	3858- 4020-	3854- 4023-	4004- 4184-
QUEENSTON	4324-	4271-	4204-	4445-	4331-	4084-	4430-	4028-	4034-	4191-
PRODUCING FORMATION	Medina	Medina	Medina	Medina	Medina	Medina	Medina	Medina	Medina	Medina
PRODUCING INTERVAL	4173-4323	4120-4269	4048-4202	4307-4441	4169-4326	3921-4079	4319-4336	3881-3961	3886-3959	4049-4126
TOTAL DEPTH	4352	4350	4300	4527	4485	4172	4569	4130	4130	4295
DEEPEST FORMATION REACHED	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston
RESULTS	87 Mcf AF 1,240 psi/96 hrs. development Carlson pool Conneaut field	68 Mcf AF 1,140 psi/304 hrs. development Indian Springs pool Conneaut field	96 Mcf AF 1,200 psi/308 hrs. development Cussewago field	74 Mcf AF 1,140 psi/88 hrs. development Carlson pool Conneaut field	82 Mcf AF 1,230 psi/428 hrs. development Carlson pool Conneaut field	110 Mcf AF 1,210 psi/162 hrs. extension Indian Springs pool Conneaut field	700 Mcf AF 1,250 psi/48 hrs. development Rockdale field	337 Mcf AF 1,095 psi/96 hrs. development Cambridge Springs field	165 Mcf AF 1,125 psi/48 hrs. development Cambridge Springs field	195 Mcf AF 1,180 psi/168 h development Cambridge Springs field

Figure 35. *(Continued).*

COUNTY Permit Number	Crawford 22091	Crawford 22096	Crawford 22097	Crawford 22102	Crawford 22104	Crawford 22109	Crawford 22110	Crawford 22111	Crawford 22112	Crawford 22118
NAME OF WELL	Nichols Unit #1	Kenneth Reynolds #1	S. Oscar Dean #1	John W. Petrow #1	Blood & Brown #1	J. D. Kachik #1	John W. Corklin #1	James Webster #1	Joseph T. Jacobs #1	John L. Hindman #1
OPERATOR	Meridian Exploration #737	Mitchell Energy Corporation	Meridian Exploration #711	Mitchell Energy Corporation	Mitchell Energy Corporation	Meridian Exploration #150	Meridian Exploration #151	Meridian Exploration #152	Mitchell Energy Corporation	Mitchell Energy Corporation
TOWNSHIP	Rockdale	Summit	Rockdale	Summerhill	Summit	Richmond	Rockdale	Cambridge	Summerhill	Summit
QUADRANGLE	Miller's Station	Harmonsburg	Miller's Station	Linesville	Linesville	Miller's Station	Miller's Station	Cambridge Springs	Linesville	Harmonsburg
LATITUDE	1,950 ft. S 41°47'30"	8,765 ft. S 41°42'30"	11,650 ft. S 41°50'00"	2,130 ft. S 41°45'00"	9,860 ft. S 41°40'00"	12,150 ft. S 41°47'30"	9,950 ft. S 41°47'30"	9,500 ft. S 41°52'30"	8,050 ft. S 41°45'00"	1,010 ft. S 41°40'00"
LONGITUDE	5,800 ft. W 79°55'00"	8,380 ft. W 80°20'00"	500 ft. W 79°55'00"	2,930 ft. W 80°22'30"	3,450 ft. W 80°22'30"	150 ft. W 79°55'00"	400 ft. W 79°55'00"	450 ft. W 80°02'30"	4,000 ft. W 80°22'30"	1,120 ft. W 80°20'00"
DATE COMPLETED	1-23-84	1-31-84	12-23-83	3-4-84	2-15-84	3-25-84	3-8-84	2-14-84	3-1-84	2-16-84
ELEVATION	1390 GR	1222 GR	1490 GR	1053 GR	1093 GR	1205 GR	1280 GR	1310 GR	1112 GR	1128 GR
LOGS RECEIVED AND LOGGED INTERVALS	DBC/CNL: 0-4504 DLL: 3980-4490 PCL: 4100-4498	GR/PCL: 2260-4260	DBC/CNL: 2663-4650 DI/LL: 2650-4651	DBC/CNL: 1924-3952 DLL: 1870-3939	GR: 2200-4241	DBC/CNL: 2495-4516 IL/LL: 24-4516	DBC/CNL: 2551-4560 IL/LL: 2550-4561	DBC/CNL: 46-4280 IL/LL: 2200-4277	GR: 2000-4054	DBC/CNL: 2215-4267 DLL: 2240-4255
TULLY	2844-	2524-	2942-	2224-	2514-	2764-	2822-	2538-	2324-	2496-
ONONDAGA LIMESTONE CHERT	3064-	2680-	3166-	2390-	2680-	2984-	3044-	2762-	2486-	2656-
ORISKANY	3248-		3348-	2586-	2870-					2852-
HELDERBERG KEYSER-BASS ISLANDS	3268-	2878-	3368-	2592-	2879-	3162-	3224-	2992-	2688-	2868-
SALINA GUELPH-LOCKPORT	3309- 3920-	2976- 3676-	3408- 4016-	2665- 3314-	2970- 3680-	3222- 3870-	3284- 3914-	3051- 3642-	2766- 3452-	2944- 3646-
CLINTON IRONDEQUOIT	4193- 4251-	3910- 3984-	4287- 4344-	3586- 3654-	3937- 3992-	4128- 4202-	4186- 4244-	3916- 3972-	3696- 3766-	3912- 3968-
MEDINA GRIMSBY WHIRLPOOL	4290- 4456-	4028- 4199-	4384- 4550-	3692- 3864-	4034- 4210-	4254- 4412-	4296- 4458-	3996- 4178-	3805- 3980-	4010- 4181-
QUEENSTON	4472-	4208-	4562-	3872-	4222-	4424-	4472-	4187-	3987-	4194-
PRODUCING FORMATION	Medina	Medina	Medina	Medina	Medina	Medina	Medina	Medina	Medina	Medina
PRODUCING INTERVAL	4375-4405	4050-4203	4430-4500	3717-3868	4058-4221	4290-4368	4340-4397	4042-4096	3824-3985	4037-4191
TOTAL DEPTH	4575	4300	4657	3954	4283	4521	4562	4285	4070	4270
DEEPEST FORMATION REACHED	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston
RESULTS	267 Mcf AF 1,160 psi/144 hrs. development Brown Hill pool Eaton Corners field	94 Mcf AF 1,278 psi/448 hrs. development Carlson pool Conneaut field	211 Mcf AF 1,140 psi/72 hrs. development Rockdale field	82 Mcf AF 1,109 psi/306 hrs. development Indian Springs pool Conneaut field	98 Mcf AF 1,220 psi/146 hrs. development Carlson pool Conneaut field	229 Mcf AF 1,140 psi/240 hrs. development Brown Hill pool Eaton Corners field	213 Mcf AF 1,160 psi/144 hrs. development Brown Hill pool Eaton Corners field	291 Mcf AF 1,190 psi/336 hrs. extension Cambridge Springs field	94 Mcf AF 1,228 psi/240 hrs. development Indian Springs pool Conneaut field	94 Mcf AF 1,220 psi/240 hrs. development Carlson pool Conneaut field

COUNTY Permit Number	Crawford 22119	Crawford 22121	Crawford 22130	Crawford 22133	Crawford 22135	Crawford 22137	Crawford 22153	Crawford 22155	Crawford 22156	Crawford 22159
NAME OF WELL	John L. Hindman #3	Birt Rawson #1	Emerson E. Thompson #1	J. Roncaglione #1	W. L. Dunn Construction #5	Robert Hammer #1	Paul Woodworth #1	Robert P. Evans #1	Donald Green #2	Robert Mickle #1
OPERATOR	Mitchell Energy Corporation	Mitchell Energy Corporation	Mitchell Energy Corporation	Mitchell Energy Corporation	Cabot Oil & Gas Corporation	Cabot Oil & Gas Corporation	Cabot Oil & Gas Corporation	Mitchell Energy Corporation	Meridian Exploration #162	Meridian Exploration #169
TOWNSHIP	Summit	Sadsbury	Summit	Conneaut	Fairfield	Fairfield	Fairfield	Conneaut	Cambridge	Rockdale
QUADRANGLE	Harmonsburg	Conneaut Lake	Harmonsburg	Linesville	Cochranton	Geneva	Cochranton	Linesville	Cambridge Springs	Miller's Station
LATITUDE	1,280 ft. S 41°40'00"	6,125 ft. S 41°37'30"	8,500 ft. S 41°42'30"	10,250 ft. S 41°42'30"	5,900 ft. S 41°32'30"	6,900 ft. S 41°32'30"	8,200 ft. S 41°32'30"	12,950 ft. S 41°45'00"	10,450 ft. S 41°52'30"	9,250 ft. S 41°50'00"
LONGITUDE	8,675 ft. W 80°17'30"	10,050 ft. W 80°17'30"	2,925 ft. W 80°17'30"	91250 ft. W 80°27'30"	5,900 ft. W 80°02'30"	1,500 ft. W 80°07'30"	9,600 ft. W 80°02'30"	6,810 ft. W 80°22'30"	7,000 ft. W 80°00'00"	4,700 ft. W 79°57'30"
DATE COMPLETED	2-23-84	2-29-84	3-5-84	2-23-84	3-16-84	4-1-84	4-16-84	3-12-84	6-28-84	3-17-84
ELEVATION	1102 GR	1152 GR	1215 GR	1040 GR	1070 GR	1146 GR	1365 GR	1185 GR	1325 GR	1180 GR
LOGS RECEIVED AND LOGGED INTERVALS	GR: 2200-4259	DBC/CNL: 2448-4462 DLL: 2290-4451	DBC/CNL: 2369-4368 DLL: 2370-4360	DBC/CNL: 415-4046 DLL: 415-4038 SON: 415-4036	GR/CAL: 0-4954	GR: 4576-4934	DBC/GR: 0-5178	DBC/CNL: 2114-4116 DLL: 2052-4106	GR/DBC: 0-4326 DI: 2580-4326	DBC/CNL: 2230-4272 IL/GR: 2200-3422
TULLY	2505-	2678-	2582-	2230-	3082-		3402-	2390-	2594-	2560-
LIMESTONE ONONDAGA CHERT	2666-	2835-	2756-	2410-	3288-		3602-	2546-	2816-	2782-
ORISKANY	2866-	3033-	2956-	2619-			3772-	2750-		
HELDERBERG KEYSER-BASS ISLANDS	2872-	3041-	2968-	2628-	3459-		3792-	2762-	3042-	2968-
SALINA GUELPH-LOCKPORT	2956- 3663-	3130- 3846-	3011- 3708-	2708- 3406-	3584- 4322-		3890- 4654-	2836- 3504-	3102- 3760-	3036- 3640-
CLINTON IRONDEQUOIT	3924- 4004-	4108- 4164-	3994- 4050-	3654- 3726-	4592- 4654-	4611- 4662-	4918- 4980-	3778- 3846-	3950- 4024-	3884- 3968-
MEDINA GRIMSBY WHIRLPOOL	4024- 4196-	4211- 4388-	4092- 4262-	3764- 3930-	4712- 4890-	4716- 4901-	5036- 5198-	3888- 4064-	4076- 4228-	3991- 4172-
QUEENSTON	4204-	4400-	4278-	3946-	4904-	4916-	5212-	4070-	4240-	4186-
PRODUCING FORMATION	Medina	Medina	Medina	Medina	Medina	Medina	Medina	Medina	Medina	Medina
PRODUCING INTERVAL	4049-4202	4238-4398	4118-4273	3786-3943	4764-4836	4767-4866	5074-5163	3906-4067	4114-4174	4047-4164
TOTAL DEPTH	4267	4464	4370	4048	4960	4976	5290	4120	4341	4279
DEEPEST FORMATION REACHED	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston
RESULTS	83 Mcf AF 1,214 psi/240 hrs. development Carlson pool Conneaut field	72 Mcf AF 1,065 psi/114 hrs. development Conneaut Lake field	90 Mcf AF 1,255 psi/240 hrs. development Carlson pool Conneaut field	87 Mcf AF 1,240 psi/336 hrs. extension Blood pool Conneaut field	1,750 Mcf AF 1,250 psi/48 hrs. development East Fairfield pool Kantz Corners field	84 Mcf AF 1,100 psi/48 hrs. development Kantz Corners field	1,100 Mcf AF 1,320 psi/48 hrs. development Kantz Corners field	81 Mcf AF 1,190 psi/173 hrs. development Indian Springs pool Conneaut field	1,[illegible] Mcf AF 1,140 psi/144 hrs. extension Rockdale field	[illegible]42 Mcf AF 1,180 psi/144 hrs. development Rockdale field

Figure 35. *(Continued).*

COUNTY Permit Number	Crawford 22177	Crawford 22213	Crawford 22215	Crawford 22220	Crawford 22222	Crawford 22223	Crawford 22233	Crawford 22234	Crawford 22236	Elk 21533
NAME OF WELL	Wright #3	Lampman #1	Lampman #3	Borovic #1	Borovic #3	Bernat #2	Wright #S-1	Lampman #4	Fred T. Ewing #1	Texas Gulf, Inc. #1
OPERATOR	Cosimo & Geraldine Occhipinti	Cosimo & Geraldine Occhipinti	Cosimo & Geraldine Occhipinti	Cosimo & Geraldine Occhipinti	Cosimo & Geraldine Occhipinti	Cosimo & Geraldine Occhipinti	Cosimo & Geraldine Occhipinti	Cosimo & Geraldine Occhipinti	Mitchell Energy Corporation	Hanley & Bird #1734
TOWNSHIP	Woodcock	Conneaut	Conneaut	Conneaut	Conneaut	Conneaut	Woodcock	Conneaut	Summit	Jones
QUADRANGLE	Meadville	Linesville	Linesville	Linesville	Linesville	Linesville	Meadville	Linesville	Harmonsburg	Wilcox
LATITUDE	1,760 ft. S 41°42'30"	4,650 ft. S 41°42'30"	5,150 ft. S 41°42'30"	3,300 ft. S 41°42'30"	1,925 ft. S 41°42'30"	7,480 ft. S 41°42'30"	2,900 ft. S 41°42'30"	600 ft. S 41°42'30"	14,250 ft. S 41°42'30"	6,250 ft. S 41°35'00"
LONGITUDE	3,140 ft. W 80°07'30"	650 ft. W 80°25'00"	10,000 ft. W 80°22'30"	5,130 ft. W 80°22'30"	5,650 ft. W 80°22'30"	10,790 ft. W 80°22'30"	600 ft. W 80°07'30"	7,680 ft. W 80°22'30"	1,530 ft. W 80°20'00"	1,550 ft. W 78°42'30"
DATE COMPLETED	6-13-84	6-27-84	6-23-84	7-1-84	7-11-84	6-15-84	6-19-84	7-4-84	7-25-84	7-31-84
ELEVATION	1242 GR	1120 GR	1190 GR	1189 GR	1190 GR	1182 GR	1213 GR	1190 GR	1150 GR	1635 GR
LOGS RECEIVED AND LOGGED INTERVALS		OBC/CNL: 2099-4133 LL: 2041-4123 Laser: 3853-4038		DBC/CNL: 2197-4216 LL: 2198-4214 Laser: 3935-4068 PCL: 3971-4021	GR: 2493-4211	OBC/CNL: 2218-4224 LL: 2220-4221 Laser: 3952-4094			GR: 2250-4273	
TULLY	2690-	2360-	2295-	2422-		2456-	2692-	2300-	2520-	5000-
ONONDAGA LIMESTONE CHERT	2885-	2506-	2575-	2580-	2578-	2606-	2890-	2542-	2680-	5510-
ORISKANY		2712-		2782-	2784-					
HELDERBERG KEYSER-BASS ISLANDS	3072-	2720-	2916-	2798-	2792-	2806-	3220-	2882-	2876-	5650-
SALINA GUELPH-LOCKPORT	3342- 3822-	2796- 3500-	3010- 3542-	2878- 3584-	2884- 3585-	2890- 3568-	3352- 3820-	2984- 3504-	2966- 3642-	6030- 7045-
CLINTON IRONDEQUOIT		3746- 3814-		3826- 3896-	3822- 3896-	3836- 3908-			3938- 3990-	7155-
MEDINA GRIMSBY WHIRLPOOL	4200- 4382-	3854- 4030-	3914- 4084-	3936- 4111-	3937- 4110-	3950- 4126-	4200- 4390-	3882- 4042-	4036- 4209-	
QUEENSTON	4398-	4038-	4110-	4120-	4119-	4132-	4402-	4066-	4218-	Tuscarora 7203-
PRODUCING FORMATION	Medina	Medina	Medina	Medina	Medina	Medina	Medina	Medina	Medina	
PRODUCING INTERVAL	4245-4306	3905-3943	3978-4014	3971-4021	3978-4025	4009-4089	4287-4332	3912-4011	4063-4211	
TOTAL DEPTH	4517	4150	4190	4235	4242	4234	4504	4170	4276	7322
DEEPEST FORMATION REACHED	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	Tuscarora
RESULTS	500 Mcf AF 1,200 psi/72 hrs. development Kastle pool Conneaut field	650 Mcf AF 1,300 psi/72 hrs. development Blood pool Conneaut field	650 Mcf AF 1,300 psi/72 hrs. development Blood pool Conneaut field	780 Mcf AF 1,200 psi/72 hrs. development Indian Springs pool Conneaut field	550 Mcf AF 1,200 psi/72 hrs. development Blood pool Conneaut field	650 Mcf AF 1,300 psi/72 hrs. development Blood pool Conneaut field	600 Mcf AF 1,250 psi/72 hrs. development Kastle pool Conneaut field	650 Mcf AF 1,250 psi/72 hrs. development Indian Springs pool Conneaut field	105 Mcf AF 1,260 psi/180 hrs. development Carlson pool Conneaut field	Plugged and abandoned Deeper pool test Shallow show of gas Wilcox field

COUNTY Permit Number	Erie 21461	Erie 21548	Erie 21705	Erie 21720	Erie 21825	Erie 21868	Erie 21877	Erie 21995	Erie 22092-D	Erie 22094
NAME OF WELL	M. Pavkov #1	C. Crowell #1	Moraski & Webster #1	Walter & Aino Rinne #1	Richard Harrington #1	Donald Wickwire #2	Dingle #1	Robert Randall #1	Lawrence G. Boyd #1	Michael Feuerwerker #1
OPERATOR	C & C Troyer Bros. #46	Envirogas, Incorporated	N.E.A. Cross Company	Mitch-Well Energy, Incorporated	N.E.A. Cross Company	Paco, Incorporated	C & C Troyer Brothers #57	Paco, Incorporated	Lawrence G. Boyd	Paco, Incorporated
TOWNSHIP	Washington	Concord	Waterford	LeBoeuf	Waterford	Conneaut	Waterford	Conneaut	North East	Conneaut
QUADRANGLE	Edinboro North	Corry	Cambridge Spgs., NE	Cambridge Spgs., NE	Cambridge Spgs., NE	E. Springfield	Waterford	Beaver Center	Harborcreek	Beaver Center
LATITUDE	125 ft. S 41°55'00"	14,850 ft. S 41°57'30"	14,000 ft. S 41°57'30"	1,000 ft. S 41°55'00"	150 ft. S 41°55'00"	14,050 ft. S 41°55'00"	2,000 ft. S 41°57'30"	50 ft. S 41°52'30"	450 ft. S 42°12'30"	200 ft. S 41°52'30"
LONGITUDE	2,200 ft. W 80°07'30"	7,800 ft. W 79°40'00"	4,650 ft. W 80°00'00"	1,650 ft. W 80°00'00"	4,450 ft. W 80°00'00"	5,050 ft. W 80°22'30"	6,400 ft. W 79°57'30"	4,300 ft. W 80°22'30"	4,350 ft. W 79°52'30"	1,750 ft. W 80°22'30"
DATE COMPLETED	7-26-81	12-3-81	11-27-81	2-24-82	2-1-82	4-17-82	3-12-82	8-30-82	8-19-83	9-10-82
ELEVATION	1235 GR	1375 GR	1365 GR	1310 GR	1430 GR	860 GR	1290 GR	876 GR	730 GR	976 GR
LOGS RECEIVED AND LOGGED INTERVALS		FDC/GR: 0-4386 DLL: 2366-4360	FDC: 2450-4100	GR/CNL: 300-4112	DBC/CNL: 1500-4278 LL: 3638-4274 IL: 1500-3300	GR: 1720-3352	DBC/LL: 2050-3883 PCL: 3676-3728	FDC/GR: 1700-3378 GR/PCL: 3100-3362		FDC/GR: 1850-3554 GR/PCL: 3150-3562
TULLY	2240-	2704-		2426-	2525-	1742-	2142-	1754-	Marcellus 1245-	1868-
ONONDAGA LIMESTONE CHERT	2440-	2961-	2636-	2642-	2747-	1914-	2368-	1928-	1335-	2040-
ORISKANY		3151-				2174-				
HELDERBERG KEYSER-BASS ISLANDS		3162-	2828- 2894-	2899-	3006-	2181-	2561- 2623-	2202-		2308-
SALINA GUELPH-LOCKPORT		3206- 3750-	2924- 3480-	2966- 3510-	3032- 3613-	2263- 2852-	2649- 3254-	2276- 2916-		2382- 2934-
CLINTON IRONDEQUOIT	3622-	4015- 4075-	3760- 3814-	3761- 3823-	3855- 3932-	3095- 3142-	3535- 3584-	3083- 3136-		3197- 3250-
MEDINA GRIMSBY WHIRLPOOL	3654- 3824-	4098- 4272-	3840- 4012-	3869- 4022-	3956- 4128-	3166- 3340-	3612- 3784-	3160- 3322-		3276- 3437-
QUEENSTON	3832-	4284-	4022-	4030-	4137-	3346-	3793-	3338-		3456-
PRODUCING FORMATION	Medina	Medina	Medina	Medina	Medina	Medina	Medina	Medina	Marcellus Shale	Medina
PRODUCING INTERVAL	3694-3748	4142-4280	3900-3950	3876-3910	4018-4062	3201-3278	3676-3728	3184-3269		3329-3375
TOTAL DEPTH	3934	4389	4107	4113	4170	3380	3891	3394	1500	3665
DEEPEST FORMATION REACHED	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	Onondaga	Queenston
RESULTS	1,000 Mcf AF 1,125 psi/168 hrs. development Edinboro field	100 Mcf AF 1,195 psi/240 hrs. development Beaver Dam pool Corry field	4,000 Mcf AF 1,160 psi/48 hrs. development Swails pool Drumlin field	8,559 Mcf AF 1,150 psi/? hrs. development Mill Village field	4,000 Mcf AF 1,200 psi/48 hrs. development Swails pool Drumlin field	650 Mcf AF 970 psi/24 hrs. development Bushnell-Lexington pool Conneaut field	2,500 Mcf AF 1,150 psi/168 hrs. development Waterford pool LeBoeuf field	1,750 Mcf AF 1,100 psi/24 hrs. development Bushnell-Lexington pool Conneaut field	1 Mcf Nat. 14 psi/24 hrs. Old well deepened non-commercial North East Shallow pool North East field	500 Mcf AF 700 psi/24 hr development Lundy-La pool Conne field

Figure 35. *(Continued).*

COUNTY Permit Number	Erie 22117	Erie 22118	Erie 22119	Erie 22134	Erie 22142-D	Erie 22269	Erie 22271	Erie 22289	Erie 22291	Erie 22525
NAME OF WELL	Charles Strait #1	Glenn Carter #1	David & Shirley Kaufer #1	Mountain #2	Jack Snyder #1	Nelson Jones #1	Lawrence Pieper #1	Snodgrass #1	Joseph Meako #1	Tydings #3
OPERATOR	Paco, Incorporated	Paco, Incorporated	Paco, Incorporated	Vineyard Oil & Gas Company	Cliff Troyer & Sons	Cardinal Oil Company #20	Cardinal Oil Company #23	Northwest Natural Gas Company	Paco, Incorporated	Petro Evaluation Services, Inc.
TOWNSHIP	Conneaut	Conneaut	Albion	Venango	Washington	Franklin	Franklin	Conneaut	Albion	Franklin
QUADRANGLE	E. Springfield	E. Springfield	Albion	Wattsburg	Cambridge Spgs., NE	Edinboro North	Edinboro North	Beaver Center	Albion	Edinboro North
LATITUDE	10,350 ft. S 41°55'00"	11,400 ft. S 41°55'00"	11,600 ft. S 41°55'00"	450 ft. S 42°02'30"	8,400 ft. S 42°00'00"	4,620 ft. S 41°55'00"	2,760 ft. S 41°55'00"	3,300 ft. S 41°52'30"	12,000 ft. S 41°55'00"	2,710 ft. S 41°55'00"
LONGITUDE	100 ft. W 80°22'30"	1,050 ft. W 80°22'30"	10,850 ft. W 80°20'00"	4,500 ft. W 79°50'00"	3,500 ft. W 80°00'00"	100 ft. W 80°12'30"	1,860 ft. W 80°12'30"	2,550 ft. W 80°22'30"	9,750 ft. W 80°20'00"	7,900 ft. W 80°12'30"
DATE COMPLETED	9-20-82	9-18-82	9-15-82	7-7-82	2-14-84	9-29-82	10-6-82	6-15-83	9-28-82	1-25-83
ELEVATION	870 GR	880 GR	899 GR	1440 GR	1500 GR	1315 GR	1295 GR	980 GR	933 GR	1270 GR
LOGS RECEIVED AND LOGGED INTERVALS	FOC: 1700-3344 GR: 3300-3313	FOC: 1700-3431 GR: 3000-3354	FDC/GR: 1700-3369 PCL: 3050-3370	PCL: 2546-3814					FOC/GR: 1750-3433 PCL: 3150-3420	FDC/GR: 250-3770
TULLY	1723-	1762-	1708-	2282-	2230-	2284-	2200-	1890-	1798-	2127-
LIMESTONE ONONDAGA CHERT	1896-	1934-	1934-	2508-	2450-	2436-	2401-	2062-	1968-	2328-
ORISKANY	2093-	2192-	2189-	2698-	2750-				2218-	
HELDERBERG KEYSER-BASS ISLANDS	2104-	2208-	2203-	2740-	2762-	2636-	2599-	2314-	2233-	2608-
SALINA GUELPH-LOCKPORT	2248- 2792-	2290- 2832-	2282- 2840-	3156- 3239-		2793- 3280-	2758- 3245-	2386- 2922-	2308- 2882-	2690- 3212-
CLINTON IRONDEQUOIT	3041- 3095-	3087- 3134-	3083- 3136-	3517 3620-	3653-	3542	3508	3194	3127- 3181-	3434- 3508-
MEDINA GRIMSBY WHIRLPOOL	3119- 3294-	3169- 3323-	3160- 3338-	3672- 3802-	3687-	3645-	3609-	3194-	3204- 3378-	3542- 3706-
QUEENSTON	3300-	3341-	3344-	3818-		3822-	3784-		3384-	3712-
PRODUCING FORMATION	Medina	Medina	Medina	Medina	Medina	Medina	Medina	Medina	Medina	Medina
PRODUCING INTERVAL	3186-3239	3223-3279	3182-3288	3675-3815	3747-3763	3672-3767	3632-3702	3315-3375	3238-3294	3575-3624
TOTAL DEPTH	3350	3448	3390	3897	3798	3877	3841	3405	3450	3712
DEEPEST FORMATION REACHED	Queenston	Queenston	Queenston	Queenston	Medina	Queenston	Queenston	Medina	Queenston	Queenston
RESULTS	175 Mcf AF 750 psi/? hrs. development Bushnell-Lexington pool Conneaut field	5,230 Mcf AF 1,200 psi/48 hrs. development Bushnell-Lexington pool Conneaut field	450 Mcf AF 900 psi/48 hrs. development Bushnell-Lexington pool Conneaut field	850 Mcf AF 910 psi/72 hrs. development Dennee pool Phillipsville field	1 Mcf AF 1,100 psi well originally drilled to 1600' development Swails pool Drumlin field	89 Mcf AF 1,050 psi/48 hrs. development Franklin Center field	2,247 Mcf AF ? psi/72 hrs. development Franklin Center field	1,200 Mcf AF 990 psi/48 hrs. development Lundys Lane pool Conneaut field	350 Mcf AF 950 psi/48 hrs. development Lundys Lane pool Conneaut field	220 Mcf AF 980 psi/48 hrs. development Franklin Center field

COUNTY Permit Number	Erie 22536	Erie 22598	Erie 22633	Erie 22655	Erie 22665	Erie 22684	Erie 22685	Erie 22686	Erie 22700	Erie 22713
NAME OF WELL	Ramey #2	M. Mikovch #4	H. Mikovch #5	James McMurray #1	Chamberlain #2	Joseph Majerik #2	Thomas & Constance Arneman #1	Malinowski #3	Dorothy J. Barton #1	N. Sherman #1
OPERATOR	Petro Evaluation Services, Inc.	Envirogas, Incorporated	Envirogas, Incorporated	N.E.A. Cross Company	Northwest Natural Gas Company	N.E.A. Cross Company	N.E.A. Cross Company	N.E.A. Cross Company	N.E.A. Cross Company	Envirogas, Incorporated
TOWNSHIP	Franklin	Elk Creek	Elk Creek	LeBoeuf	Elk Creek	Waterford	Waterford	Waterford	LeBoeuf	Elk Creek
QUADRANGLE	Albion	Albion	Albion	Cambridge Springs	Conneautville	Cambridge Spgs., NE	Cambridge Spgs., NE	Cambridge Spgs., NE	Waterford	Albion
LATITUDE	7,700 ft. S 41°52'30"	5,300 ft. S 41°55'00"	6,550 ft. S 41°55'00"	3,550 ft. S 41°52'30"	6,900 ft. S 41°52'30"	13,350 ft. S 42°00'00"	12,500 ft. S 42°00'00"	10,300 ft. S 41°57'30"	10,200 ft. S 41°55'00"	8,500 ft. S 41°55'00"
LONGITUDE	500 ft. W 80°15'00"	7,150 ft. W 80°15'00"	5,650 ft. W 80°15'00"	5,250 ft. W 80°00'00"	1,400 ft. W 80°20'00"	10,000 ft. W 80°00'00"	9,050 ft. W 80°00'00"	7,000 ft. W 80°00'00"	5,900 ft. W 79°57'30"	10,600 ft. W 80°17'30"
DATE COMPLETED	1-31-83	2-5-83	1-28-83	10-11-83	6-20-83	8-24-83	9-1-83	9-26-83	10-21-83	2-21-83
ELEVATION	1261 GR	1160 GR	1175 GR	1490 GR	1120 GR	1290 GR	1290 GR	1410 GR	1210 GR	1050 GR
LOGS RECEIVED AND LOGGED INTERVALS	FDC/GR: 250-3794			FDC: 2850-4420		DBC/CNL: 1920-3920		FDC/GR: 2650-4142	GR/DBC: 2296-4064	
TULLY	2165-	2032-	2048-		2094-	2213-	2180-		2382-	1920-
ONONDAGA LIMESTONE	2362-	2226-	2240-	2902-	2222-	2436-	2408-	2672-	2614-	2106-
ONONDAGA CHERT		2421-	2446-							2300-
ORISKANY	2624-	2496-	2520-			2747-				2365-
HELDERBERG KEYSER-BASS ISLANDS	2640-	2503-	2530-	3094- 3162-	2508-	2759-		2926-	2798- 2860-	2376-
SALINA GUELPH-LOCKPORT	2696- 3249-		2632- 3108-	3187- 3794-	2670- 3120-	2848- 3292-		3006- 3518-	2880- 3450-	2486- 2976-
CLINTON IRONDEQUOIT	3491- 3549-		3400- 3437-	4053- 4116-	3378-	3556 3614-	3556-	3769- 3824-	3706- 3770-	3239- 3290-
MEDINA GRIMSBY WHIRLPOOL	3589- 3747-		3476- 3613-	4142- 4316-	3490-	3624- 3810-	3608- 3754-	3870- 4022-	3794- 3970-	3316- 3472-
QUEENSTON	3754-		3642-	4328-		3816-	3762-	4028-	3984-	3497-
PRODUCING FORMATION	Medina		Medina	Medina	Medina	Medina	Medina	Medina	Medina	Medina
PRODUCING INTERVAL	3618-3665		3491-3546	4188-4235	3510-3565	3682-3746	3630-3700	3896-3940	3902-3916	3362-344
TOTAL DEPTH	3791	2544	3713	4435	3590	3928	3830	4150	4030	357
DEEPEST FORMATION REACHED	Queenston	Bass Islands	Queenston	Queenston	Medina	Queenston	Queenston	Queenston	Queenston	Queens
RESULTS	240 Mcf AF 980 psi/48 hrs. development Pageville pool Conneaut field	Plugged and abandoned Shallow pool test Conneaut field	500 Mcf AF 1,050 psi/240 hrs. development Pageville pool Conneaut field	2,800 Mcf AF 1,100 psi/48 hrs. development Edinboro North field	1,100 Mcf AF 970 psi/? hrs. development Lundys Lane pool Conneaut field	1,000 Mcf AF 1,120 psi/48 hrs. development Swails pool Drumlin field	1,000 Mcf AF 1,100 psi/48 hrs. development Swails pool Drumlin field	2,800 Mcf AF 1,000 psi/48 hrs. development Swails pool Drumlin field	2,000 Mcf AF 1,000 psi/48 hrs. development Mill Village field	800 Mcf AF 1,025 psi/240 hr development Lundys Lane pool Conneaut field

Figure 35. *(Continued).*

COUNTY Permit Number	Erie 22740	Erie 22741	Erie 22744	Erie 22755	Erie 22766	Erie 22872	Erie 22876	Erie 22882	Erie 22904	Erie 22908
NAME OF WELL	Herbert Miller #5	Richard Applebee #4	Richard Applebee #1	Herbert Yosten #2	Thomas Zimmerman #2	Feistal & Nathan #3	Blum & Turner #1	Edinboro Gravel #3	L. McAtee #1	Paul Skelton #3
OPERATOR	Kaltsas Oil Company, Inc.	Kaltsas Oil Company, Inc.	Kaltsas Oil Company, Inc.	Kaltsas Oil Company, Inc.	Kaltsas Oil Company, Inc.	N.E.A. Cross Company	N.E.A. Cross Company	Meridian Exploration #696	Meridian Exploraton #692	N.E.A. Cross Company
TOWNSHIP	Greenfield	Venango	Venango	Greenfield	Greenfield	LeBoeuf	Mill Village	Washington	Washington	Waterford
QUADRANGLE	Wattsburg	Wattsburg	Wattsburg	Hammett	Wattsburg	Waterford	Waterford	Cambridge Springs	Edinboro South	Waterford
LATITUDE	8,100 ft. S 42°07'30"	150 ft. S 42°05'00"	2,100 ft. S 42°05'00"	8,550 ft. S 42°07'30"	6,400 ft. S 42°07'30"	14,800 ft. S 41°55'00"	14,350 ft. S 41°55'00"	7,250 ft. S 41°52'30"	8,700 ft. S 41°52'30"	4,700 ft. S 41°57'30"
LONGITUDE	6,900 ft. W 79°47'30"	380 ft. W 79°50'00"	8,700 ft. W 79°47'30"	4,350 ft. W 79°52'30"	4,320 ft. W 79°50'00"	9,750 ft. W 79°57'30"	5,500 ft. W 79°57'30"	7,500 ft. W 80°05'00"	4,800 ft. W 80°07'30"	3,900 ft. W 79°57'30"
DATE COMPLETED	9-11-83	9-4-83	10-17-83	8-30-83	6-23-84	9-1-83	8-17-83	8-3-83	6-5-83	10-14-83
ELEVATION	1370 GR	1356 GR	1460 GR	1415 GR	1460 GR	1160 GR	1190 GR	1170 GR	1385 GR	1210 GR
LOGS RECEIVED AND LOGGED INTERVALS			DBC/CNL: 2250-3809				FDC/CNL: 2102-4115	CNL: 29-4038 DI/LL: 2003-4035	DBC/GR: 2200-4214 DI/LL: 2190-4213	FDC: 2300-3758
TULLY	2122-	2132-	2284-	2104-	2172-	2352-	2404-	2302-	2478-	2110-
ONONDAGA LIMESTONE CHERT	2360-	2355-	2518-	2330-	2411-	2586-	2640-	2528-	2696-	2334-
ORISKANY					2611-					
HELDERBERG KEYSER-BASS ISLANDS			2740-				2816- 2881-	2780-	2940-	2532- 2606-
SALINA GUELPH-LOCKPORT	2656- 2900-	2630- 2900-	2808- 3218-	2592- 2922-	2639- 3122-		2906- 3494-	2848- 3438-	3012- 3611-	2630- 3232-
CLINTON IRONDEQUOIT	3384-	3388-	3461- 3526-		3444-	3768-	3740- 3804-	3693- 3746-	3867- 3920-	3488- 3548-
MEDINA GRIMSBY WHIRLPOOL	3400- 3560-	3404- 3566-	3549- 3708-	3400- 3570-	3476- 3590- 3625-	3806- 3970-	3828- 4004-	3770- 3952-	3968- 4124-	3572- 3742-
QUEENSTON	3578-	3578-	3722-	3586-	3638-	3980-	4016-	3960-	4130-	3753-
PRODUCING FORMATION	Medina	Medina	Medina	Medina	Medina	Medina	Medina	Medina	Medina	Medina
PRODUCING INTERVAL	3472-3573	3459-3573	3631-3717	3454-3579	3476-3638	3849-3920	3903-3947	3816-3869	3990-4040	3640-3692
TOTAL DEPTH	3640	3646	3810	3656	3718	4090	4127	4050	4239	3765
DEEPEST FORMATION REACHED	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston
RESULTS	5,000 Mcf AF 980 psi/72 hrs. development Hornby pool North East field	650 Mcf AF 1,020 psi/120 hrs. development Little Hope pool North East field	325 Mcf AF 500 psi/24 hrs. development Little Hope pool North East field	36 Mcf Nat. 375 Mcf AF 980 psi/72 hrs. development Hornby pool North East field	150 Mcf AF 1,000 psi development Hornby pool North East field	500 Mcf AF 1,000 psi/48 hrs. development Mill Village field	2,000 Mcf AF 800 psi/48 hrs. development Mill Village field	60 Mcf Nat. 213 Mcf AF 1,100 psi/196 hrs. development Edinboro field	278 Mcf AF 1,100 psi/216 hrs. development Edinboro field	5,000 Mcf AF 1,000 psi/48 hrs. development Waterford pool LeBoeuf field

COUNTY Permit Number	Erie 22960	Erie 22961	Erie 23011	Erie 23061	Erie 23062	Erie 23063	Erie 23064	Erie 23065	Erie 23079	Erie 23080
NAME OF WELL	Walter Rinne #3	Carroll-Young #1	Edward Anyzek #1	Mary Sealy #1	Kenneth Anderson #1	Samuel Faulhaber #3	Leo A. Pfadt #2	Louis & Ralph Bizzarro #2	Ira & Lillian Hinkson #1	Julia D. Brown #1E
OPERATOR	Mitch-Well Energy, Incorporated	Mitch-Well Energy, Incorporated	N.E.A. Cross Company	N.E.A. Cross Company	N.E.A. Cross Company	N.E.A. Cross Company	N.E.A. Cross Company	N.E.A. Cross Company	NRM Petroleum Corporation	NRM Petroleum Corporation
TOWNSHIP	LeBoeuf	Waterford	LeBoeuf	LeBoeuf	Waterford	Waterford	Waterford	Waterford	Greene	LeBoeuf
QUADRANGLE	Cambridge Spgs., NE	Waterford	Cambridge Spgs., NE	Cambridge Springs	Waterford	Waterford	Cambridge Spgs., NE	Cambridge Spgs., NE	Hammett	Miller's Station
LATITUDE	2,750 ft. S 41°55'00"	12,400 ft. S 42°00'00"	13,250 ft. S 41°55'00"	1,000 ft. S 41°52'30"	8,100 ft. S 42°00'00"	10,750 ft. S 42°00'00"	1,250 ft. S 41°57'30"	375 ft. S 41°57'30"	14,810 ft. S 42°02'30"	4,900 ft. S 41°52'30"
LONGITUDE	1,700 ft. W 80°00'00"	700 ft. W 79°57'30"	7,250 ft. W 80°00'00"	7,900 ft. W 80°00'00"	10,200 ft. W 79°57'30"	500 ft. W 79°57'30"	525 ft. W 80°00'00"	650 ft. W 80°00'00"	5,350 ft. W 79°57'30"	1,570 ft. W 79°55'00"
DATE COMPLETED	12-24-83	10-29-83	8-24-83	11-14-83	12-30-83	9-9-83	11-20-83	11-14-83	8-24-83	7-24-83
ELEVATION	1270 GR	1310 GR	1450 GR	1400 GR	1260 GR	1280 GR	1370 GR	1390 GR	1217 GR	1580 GR
LOGS RECEIVED AND LOGGED INTERVALS	PCL: 3250-4060	FDC/GR: 400-3840	FDC/GR: 2405-4420	FDC/CNL: 2299-4322	FDC/GR: 2000-3787	FDC/CNL: 1854-3877	DBC/CNL: 1935-3945	DBC/CNL: 1909-3963	FDC/GR: 1900-3677	DBC/GR: 2850-4558 IL: 2850-4560
TULLY		2161-	2682-	2576-	2033-	2146-	2196-	2210-	1998-	2863-
ONONDAGA LIMESTONE CHERT		2388-	2902-	2798-	2276-	2368-	2416-	2430-	2224-	3092-
ORISKANY				3048-					2477-	
HELDERBERG KEYSER-BASS ISLANDS		2572- 2636-	3150-	3073-	2452- 2500-	2628-	2685-	2700-	2496-	3261- 3314-
SALINA GUELPH-LOCKPORT	3502-	2655- 3252-	3216- 3772-	3116- 3898-	2520- 3152-	2722- 3260-	2774- 3322-	2780- 3365-	2582- 3090-	3344- 3958-
CLINTON IRONDEQUOIT	3642- 3788-	3506- 3554-	4042- 4097-	3943- 3998-	3404- 3460-	3503- 3564-	3568- 3640-	3590- 3664-	3356- 3405-	4223- 4276-
MEDINA GRIMSBY WHIRLPOOL	3836- 3990-	3577- 3748-	4146- 4294-	4021- 4196-	3484- 3654-	3586- 3758-	3676- 3838-	3692- 3862-	3426- 3594-	4302- 4478-
QUEENSTON	3997-	3758-	4305-	4208-	3666-	3768-	3847-	3870-	3604-	4482-
PRODUCING FORMATION	Medina	Medina	Medina	Medina	Medina	Medina	Medina	Medina	Medina	Medina
PRODUCING INTERVAL	3873-3927	3630-3700	4169-4216	4072-4106	3550-3574	3670-3704	3740-3790	3760-3810	3437-3546	4377-4429
TOTAL DEPTH	4107	3910	4410	4324	3730	3879	3975	3975	3685	4565
DEEPEST FORMATION REACHED	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston
RESULTS	2,500 Mcf AF 1,125 psi/48 hrs. development Mill Village field	500 Mcf Nat. 1,100 psi/48 hrs. development Talcott pool Erie field	1,000 Mcf AF 1,000 psi/48 hrs. development Edinboro North field	4,200 Mcf AF 1,100 psi/48 hrs. development Edinboro North field	2,000 Mcf AF 1,100 psi/48 hrs. development Talcott pool Erie field	2,200 Mcf AF 1,000 psi/48 hrs. development Talcott pool Erie field	600 Mcf AF 1,000 psi/48 hrs. development Swails pool Drumlin field	1,000 Mcf AF 1,000 psi/48 hrs. development Swails pool Drumlin field	84 Mcf Nat. 875 Mcf AF 1,080 psi/4 hrs. development Talcott pool Erie field	4,633 Mcf AF 1,150 psi/4 hr development New Ireland field

Figure 35. *(Continued).*

COUNTY Permit Number	Erie 23081	Erie 23082	Erie 23085	Erie 23091	Erie 23107	Erie 23110	Erie 23114	Erie 23116	Erie 23120	Erie 23126
NAME OF WELL	Paul & Lillie Mongera #1	Richard & Mary Smith #1E	Arden & Marjorie Bolyard #1	E. Sawyer #1	Kaiser Aluminum & Chemical Forging	John A. Tomcho #1	Cristea/Lacny #1	Carl G. Newara #1	Steven & Dorothy Mongera #A-1	St. Mary's College #1
OPERATOR	NRM Petroleum Corporation	NRM Petroleum Corporation	NRM Petroleum Corporation	Meridian Exploration #730	Kaiser Aluminum & Chemical (KACC-1)	NRM Petroleum Corporation	N.E.A. Cross Company	Carl G. Newara	NRM Petroleum Corporation	St. Mary's College
TOWNSHIP	LeBoeuf	LeBoeuf	LeBoeuf	LeBoeuf	Erie	Amity	Waterford	North East	Amity	North East
QUADRANGLE	Miller's Station	Waterford	Miller's Station	Cambridge Spgs., NE	Erie North	Union City	Waterford	Harborcreek	Union City	North East
LATITUDE	3,920 ft. S 41°52'30"	13,280 ft. S 41°55'00"	3,420 ft. S 41°50'00"	1,400 ft. S 41°55'00"	12,800 ft. S 42°10'00"	1,720 ft. S 41°57'30"	8,850 ft. S 41°57'30"	5,000 ft. S 42°12'30"	3,120 ft. S 41°57'30"	10,800 ft. S 42°15'00"
LONGITUDE	6,590 ft. W 79°52'30"	11,150 ft. W 79°52'30"	8,500 ft. W 79°55'00"	9,000 ft. W 80°00'00"	4,650 ft. W 80°02'30"	7,600 ft. W 79°47'30"	6,450 ft. W 79°57'30"	4,350 ft. W 79°52'30"	10,690 ft. W 79°45'00"	1,000 ft. W 79°50'00"
DATE COMPLETED	8-16-83	7-19-83	7-29-83	11-21-83	8-18-83	8-4-83	10-8-83	8-17-83	8-10-83	8-12-83
ELEVATION	1595 GR	1395 GR	1495 GR	1570 GR	690 GR	1324 GR	1175 GR	750 GR	1562 GR	780 GR
LOGS RECEIVED AND LOGGED INTERVALS	GR/DBC: 2850-4576 IL: 2850-4571	GR/DBC: 2550-4318 IL: 2550-4318 PCL: 4137-4180	FOC/GR: 2750-4449 IL/LL: 2750-4449 PCL: 4400-4465	DBC/CNL: 2318-4332 LL: 2250-4329		OBC/GR: 2055-4106 DI/LL: 2043-4106 Laser: 3850-4040 CBL: 2550-4070	GR/OBC: 1751-3761		DBC/GR: 2650-4369 DI/GR: 2650-4371	
TULLY	2891-	2607-	2964-	2656-	1238-	2416-	2088-	1200-	2702-	1200-
ONONDAGA LIMESTONE CHERT	3118-	2836-	2992-	2880-	1454-	2655-	2317-		2942-	1430-
ORISKANY					1704-					
HELDERBERG KEYSER-BASS ISLANDS	3288- 3338-	3014- 3066-	3209-	3142-	1730-	2874-	2520- 2589-		3152-	
SALINA GUELPH-LOCKPORT	3374- 3970-	3724-	3272- 3834-	3178- 3689-	1797- 2166-	2948- 3498-	2610- 3218-		3224- 3774-	
CLINTON IRONDEQUOIT	4241- 4295-	3977- 4042-	4104- 4172-	3909- 4008-		3763- 3823-	3484- 3535-		4034- 4097-	2450-
MEDINA GRIMSBY WHIRLPOOL	4320- 4496-	4070- 4242-	4224- 4374-	4032- 4212-	2518-	3860- 4017-	3558- 3730-		4129- 4289-	2480- 2620-
QUEENSTON	4510-	4256-	4388-	4220-	2683-	4032-	3740-		4305-	2638-
PRODUCING FORMATION	Medina	Medina	Medina	Medina	Medina	Medina	Medina	Ohio Shale	Medina	Medina
PRODUCING INTERVAL	4361-4436	4139-4182	4250-4323	4074-4154	3547-2681	3892-3970	3605-3646		4169-4226	2515-2633
TOTAL DEPTH	4582	4323	4456	4334	2683	4108	3763	1210	4375	2715
DEEPEST FORMATION REACHED	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	Tully	Queenston	Queenston
RESULTS	267 Mcf Nat. 5,180 Mcf AF 1,200 psi/4 hrs. development New Ireland field	267 Mcf Nat. 3,156 Mcf AF 750 psi/4 hrs. development New Ireland field	84 Mcf Nat. 762 Mcf AF 1,200 psi/4 hrs. development Mill Village field	40 Mcf Nat. 997 Mcf AF 1,020 psi/48 hrs. development Mill Village field	200 Mcf AF 820 psi/72 hrs. development Lawrence Park pool Erie field	103 Mcf Nat. 94 Mcf AF 900 psi/4 hrs. development Alder Run field	5,000 Mcf AF 1,050 psi/48 hrs. development Waterford pool LeBoeuf field	200 Mcf AF 74 psi/48 hrs. producing shallow development North East pool North East field	84 Mcf Nat. 875 Mcf AF 1,300 psi/4 hrs. extension Alder Run field	403 Mcf AF 725 psi/48 hrs. development Orchard Beach pool North East field

COUNTY Permit Number	Erie 23129	Erie 23137	Erie 23142	Erie 23152	Erie 23155	Erie 23156	Erie 23157	Erie 23158	Erie 23169	Erie 23170
NAME OF WELL	Lyell Aldrich #1	Leslie Robertson #A-1	Leslie Robertson #B-1	Wise #6	Delos & Mary Port #3	Jack G. Baker #1	J. Kibbe #2	Clarence & Helen Boyd #5	McClintock #1	H. Mikovch #4-A
OPERATOR	N.E.A. Cross Company	NRM Petroleum Corporation	NRM Petroleum Corporation	N.E.A. Cross Company	N.E.A. Cross Company	Tetra Energy Group, Ltd.	Envirogas, Incorporated	N.E.A. Cross Company	Mitch-Well Energy, Incorporated	Envirogas, Incorporated
TOWNSHIP	LeBoeuf	Waterford	Waterford	LeBoeuf	LeBoeuf	Franklin	LeBoeuf	LeBoeuf	Waterford	Elk Creek
QUADRANGLE	Miller's Station	Waterford	Waterford	Waterford	Waterford	Albion	Waterford	Waterford	Waterford	Albion
LATITUDE	4,450 ft. S 41°52'30"	14,000 ft. S 42°00'00"	11,675 ft. S 42°00'00"	6,400 ft. S 41°55'00"	11,250 ft. S 41°55'00"	9,200 ft. S 41°55'00"	9,000 ft. S 42°00'00"	9,700 ft. S 41°55'00"	4,900 ft. S 41°57'30"	5,450 ft. S 41°55'00"
LONGITUDE	3,100 ft. W 79°57'30"	720 ft. W 79°57'30"	980 ft. W 79°57'30"	4,000 ft. W 79°55'00"	2,450 ft. W 79°55'00"	2,150 ft. W 80°15'00"	9,400 ft. W 79°52'30"	6,600 ft. W 79°55'00"	4,700 ft. W 79°55'00"	8,100 ft. W 80°15'00"
DATE COMPLETED	9-21-83	9-11-83	9-2-83	9-24-83	12-18-83	9-15-83	9-8-83	9-27-83	12-24-83	11-1-83
ELEVATION	1390 GR	1347 GR	1250 GR	1190 GR	1220 GR	1240 GR	1470 GR	1290 GR	1440 GR	1140 GR
LOGS RECEIVED AND LOGGED INTERVALS	DBC/CNL: 2387-4404	FDC/GR: 2200-3913 IL/LL: 2450-3916	FDC/GR: 2076-3823 LL: 2095-3820 PCL: 3598-3680 Laser: 3566-3750	GR/DBC: 2500-4042	DBC/CNL: 2095-4132	DBC/CNL: 2085-3824 GR/IL: 2085-3820 3-D VEL: 2900-3786 STRATA: 3560-3760	FDC/GR: 0-4051 DLL: 2020-4039	GR/DBC: 2202-4208	FDC/GR: 2550-4080	
TULLY	2656-	2212-	2116-		2421-	2146-	2362-	2464-		1998-
ONONDAGA LIMESTONE	2880-	2434-	2340-	2552-	2654-	2342-	2594-	2699-	2624-	2192-
ONONDAGA CHERT										2382-
ORISKANY						2603-				2450-
HELDERBERG KEYSER-BASS ISLANDS	3096-	2692-	2598-	2732- 2828-	2832- 2898-	2611-	2779- 2833-	2838- 2930-	2811- 2886-	2456-
SALINA GUELPH-LOCKPORT	3164- 3752-	2800- 3332-	2706- 3238-	2866- 3425-	2933- 3495-	2685- 3235-	2886- 3468-	2961- 3570-	2920- 3466-	2584- 3047-
CLINTON IRONDEQUOIT	4012- 4078-	3582- 3643-	3480- 3541-	3677- 3742-	3748- 3816-	3480- 3537-	3722- 3772-	3833- 3888-	3744- 3812-	3322- 3374-
MEDINA GRIMSBY WHIRLPOOL	4130- 4276-	3677- 3838-	3562- 3734-	3766- 3938-	3840- 4014-	3575- 3732-	3794- 3962-	3913- 4086-	3836- 4008-	3418- 3550-
QUEENSTON	4292-	3851-	3744-	3951-	4024-	3739-	3972-	4097-	4018-	3576-
PRODUCING FORMATION	Medina	Medina	Medina	Medina	Medina	Medina	Medina	Medina	Medina	Medina
PRODUCING INTERVAL	4182-4287	3704-3780	3605-3687	3820-3880	3920-3970	3588-3638	3828-3969	3968-4038	3880-3959	3427-3574
TOTAL DEPTH	4400	3920	3825	4045	4143	3826	4054	4200	4099	3664
DEEPEST FORMATION REACHED	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston
RESULTS	300 Mcf AF 900 psi/48 hrs. development Mill Village field	14 Mcf Nat. 3,033 Mcf AF 1,125 psi/24 hrs. development Talcott pool Erie field	60 Mcf Nat. 875 Mcf AF 1,125 psi/24 hrs. development Talcott pool Erie field	3,000 Mcf AF 1,100 psi/48 hrs. development Waterford pool LeBoeuf field	7,010 Mcf AF 800 psi/48 hrs. development Mill Village field	1,200 Mcf AF 1,010 psi/24 hrs. development Pageville pool Conneaut field	1,000 Mcf AF 1,100 psi/24 hrs. development Waterford pool LeBoeuf field	2,000 Mcf AF 700 psi/48 hrs. development Waterford pool LeBoeuf field	1,000 Mcf AF 1,125 psi/48 hrs. development Waterford pool LeBoeuf field	2,000 Mcf AF 1,025 psi/240 h development Lundys Lane pool Conneaut field

Figure 35. *(Continued).*

COUNTY Permit Number	Erie 23177	Erie 23188	Erie 23202	Erie 23203	Erie 23204	Erie 23215	Erie 23216	Erie 23217	Erie 23223	Erie 23227
NAME OF WELL	Leslie Robertson #A-2	Edward & Mary Mitchell #1	Timothy McCormick #3	Spotts #1	Laughlin/Falls #1	Keith Woods #1	W. Rodger Scott #1	Charles Brace #1	Robert & Barbara Rindfuss #3	Raymond P. McQuillen #1
OPERATOR	NRM Petroleum Corporation	NRM Petroleum Corporation	N.E.A. Cross Company	N.E.A. Cross Company	N.E.A. Cross Company	Meridian Exploration #666	NRM Petroleum Corporation	NRM Petroleum Corporation	Rindfuss Well Drilling	Raymond P. McQuillen MRP-1
TOWNSHIP	Waterford	Waterford	LeBoeuf	LeBoeuf	Waterford	Washington	Waterford	Waterford	LeBoeuf	Girard
QUADRANGLE	Waterford	Cambridge Spgs., NE	Cambridge Spgs., NE	Waterford	Waterford	Edinboro North	Waterford	Cambridge Spgs., NE	Waterford	Fairview
LATITUDE	13,440 ft. S 42°00'00"	12,480 ft. S 42°00'00"	10,350 ft. S 41°55'00"	5,050 ft. S 41°55'00"	11,550 ft. S 42°00'00"	1,400 ft. S 41°55'00"	3,670 ft. S 41°57'30"	7,870 ft. S 42°00'00"	10,350 ft. S 41°55'00"	12,800 ft. S 42°02'30"
LONGITUDE	10,780 ft. W 79°55'00"	3,230 ft. W 80°00'00"	3,050 ft. W 80°00'00"	300 ft. W 79°55'00"	8,050 ft. W 79°57'30"	4,100 ft. W 80°07'30"	8,300 ft. W 79°55'00"	11,150 ft. W 80°00'00"	10,300 ft. W 79°57'30"	5,150 ft. W 80°17'30"
DATE COMPLETED	10-16-83	10-11-83	9-16-83	10-14-83	9-16-83	10-3-83	10-25-83	9-18-83	1-9-84	9-26-83
ELEVATION	1370 GR	1382 GR	1360 GR	1220 GR	1200 GR	1220 GR	1392 GR	1238 GR	1170 GR	780 GR
LOGS RECEIVED AND LOGGED INTERVALS	FDC/GR: 2250-3968 IL/LL: 2350-3970	DBC/GR: 2030-2664 LL/GR: 2006-2660 Laser: 2578-2666	FDC/CNL: 2199-4241	DBC/GR: 2051-4077	FDC/GR: 1980-3742	DBC/CNL: 1895-3900 DIL/DLL: 438-3900	GR/DBC: 2300-4040 IL: 2300-4036	DBC/GR: 2100-3714 IL: 2100-3718	CNL/GR: 3600-3984 PCL: 3700-3990	
TULLY	2246-	2176-	2518-	2337-	2016-	2202-	2325-	2036-		Marcellus -1350?
ONONDAGA LIMESTONE CHERT	2469-	2396- Bois Blanc 2577-2628	2740-	2578-	2242-	2409-	2554-	2260-		
ORISKANY		Absent			2497-					
HELDERBERG KEYSER-BASS ISLANDS	2732-	2628- 2644-	2998-	2753- 2810-	2503-	2678-	2738- 2741-	2356- 2450-		
SALINA GUELPH-LOCKPORT	2834- 3356-		3064- 3602-	2858- 3444-	2616- 3148-	2750- 3294-	2821- 3442-	2506- 3126-		
CLINTON IRONDEQUOIT	3618- 3672-		3842- 3924-	3695- 3762-	3392- 3454-	3545- 3593-	3706- 3756-	3392- 3436-	3667-	
MEDINA GRIMSBY WHIRLPOOL	3707- 3869-		3972- 4124-	3786- 3958-	3498- 3650-	3637- 3792-	3781- 3946-	3463- 3632-	3775- 3950-	
QUEENSTON	3878-		4134-	3970-	3658-	3798-	3960-	3643-	3962-	
PRODUCING FORMATION	Medina	Bass Islands	Medina	Medina	Medina	Medina	Medina	Medina	Medina	Ohio Shale
PRODUCING INTERVAL	3744-3830	2632-2643	4016-4068	3845-3902	3520-3587	3649-3698	3852-3890	3502-3583	3785-3890	
TOTAL DEPTH	3974	2669	4241	4090	3753	3902	4045	3722	3998	1350
DEEPEST FORMATION REACHED	Queenston	Bass Islands	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	Marcellus
RESULTS	45 Mcf Nat. 1,858 Mcf AF 1,175 psi/24 hrs. development Talcott pool Erie field	4,108 Mcf Nat. 925 psi/24 hrs. Shallow pool discovery Greenley pool Drumlin field	7,000 Mcf AF 900 psi/48 hrs. development Mill Village field	1,000 Mcf AF 1,100 psi/48 hrs. development Waterford pool LeBoeuf field	2,200 Mcf AF 1,100 psi/48 hrs. development Talcott pool Erie field	368 Mcf AF 1,060 psi/240 hrs. development Edinboro field	60 Mcf Nat. 348 Mcf AF 950 psi/24 hrs. development Waterford pool LeBoeuf field	1,245 Mcf AF 1,075 psi/24 hrs. extension Swails pool Drumlin field	500 Mcf AF 650 psi/24 days development Mill Village field	26 Mcf Nat. 210 psi/24 hrs. development Erie Shallow pool Erie field

COUNTY Permit Number	Erie 23231	Erie 23232	Erie 23235	Erie 23236	Erie 23237	Erie 23238	Erie 23239	Erie 23240	Erie 23241	Erie 23245
NAME OF WELL	Donald & Marie Kreiger #2	James & Verel Salmon #2	Joseph & Clara Risjan #5	Joseph Risjan #4	Dorothy J. Seib #1	Dorothy Seib #2	Albert O'Connell #1	Jacob & Marion Pfeffer #1	Herbert Yaple #3	Bruce Johnson #1
OPERATOR	N.E.A. Cross Company	C. & S. Associates #1	NRM Petroleum Corporation	NRM Petroleum Corporation	NRM Petroleum Corporation	NRM Petroleum Corporation	NRM Petroleum Corporation	NRM Petroleum Corporation	N.E.A. Cross Company	Paco, Incorporated
TOWNSHIP	LeBoeuf	Waterford	Waterford	Waterford	Waterford	Waterford	Waterford	Waterford	LeBoeuf	Conneaut
QUADRANGLE	Waterford	Waterford	Waterford	Waterford	Waterford	Waterford	Waterford	Waterford	Cambridge Spgs., NE	E. Springfield
LATITUDE	12,300 ft. S 41°55'00"	8,250 ft. S 41°57'30"	11,740 ft. S 42°00'00"	12,600 ft. S 42°00'00"	15,050 ft. S 42°00'00"	580 ft. S 42°00'00"	14,300 ft. S 42°00'00"	11,950 ft. S 42°00'00"	9,400 ft. S 41°55'00"	6,950 ft. S 41°55'00"
LONGITUDE	9,750 ft. W 79°55'00"	10,900 ft. W 79°57'30"	7,325 ft. W 79°55'00"	6,180 ft. W 79°55'00"	5,425 ft. W 79°55'00"	6,600 ft. W 79°55'00"	7,010 ft. W 79°55'00"	2,130 ft. W 79°55'00"	7,550 ft. W 80°00'00"	8,950 ft. W 80°22'30"
DATE COMPLETED	12-13-83	10-3-83	10-16-83	11-7-83	11-1-83	10-24-83	10-25-83	10-9-83	10-1-83	10-19-83
ELEVATION	1320 GR	1175 GR	1425 GR	1440 GR	1477 GR	1482 GR	1460 GR	1390 GR	1540 GR	875 GR
LOGS RECEIVED AND LOGGED INTERVALS	OBC/CNL: 2230-4252	OBC/CNL: 1889-3910	FOC/GR: 2300-4018 IL/LL: 2300-4021	FOC/GR: 2300-4076 IL: 3050-4082	FOC/T: 421-4138	GR/DBC: 2400-4143 IL: 2750-4146	FDC/T: 2300-4099	GR/DBC: 2300-4034 IL: 3650-4036	OBC/CNL: 2458-4384	
TULLY	2510-	2187-	2298-	2328-	2392-	2404-	2358-	2312-	2660-	1690-
ONONDAGA LIMESTONE CHERT	2740-	2408-	2524-	2560-	2621-	2631-	2591-	2538-	2880-	1862-
ORISKANY		2670-								2062-
HELDERBERG KEYSER-BASS ISLANDS	2985-	2705-	2776-	2804-	2871-	2820- 2878-	2778- 2837-	2733- 2798-	3146-	
SALINA GUELPH-LOCKPORT	3024- 3601-	2769- 3302-	2880- 3402-	2882- 3446-	2940- 3506-	2900- 3522-	2898- 3474-	2853- 3458-	3214- 3754-	2232- 2736-
CLINTON IRONDEQUOIT	3874- 3940-	3552- 3604-	3669- 3758-	3678- 3760-	3756- 3818-	3781- 3834-	3732- 3786-	3691- 3740-	4024- 4078-	3022-
MEDINA GRIMSBY WHIRLPOOL	3964- 4140-	3626- 3800-	3768- 3915-	3786- 3954-	3842- 4014-	3858- 4030-	3810- 3982-	3768- 3934-	4112- 4276-	3118-
QUEENSTON	4151-	3807-	3925-	3964-	4027-	4043-	3993-	3947-	4286-	3286-
PRODUCING FORMATION	Medina	Medina	Medina	Medina	Medina	Medina	Medina	Medina	Medina	Medina
PRODUCING INTERVAL	4020-4060	3690-3720	3789-3860	3834-3900	3877-3945	3902-3982	3856-3935	3776-3866	4153-4201	3158-319[illegible]
TOTAL DEPTH	4270	3912	4025	4082	4138	4150	4100	4040	4330	3367
DEEPEST FORMATION REACHED	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston
RESULTS	2,500 Mcf AF 1,100 psi/48 hrs. development Mill Village field	500 Mcf AF 1,100 psi/48 hrs. development Swails pool Drumlin field	60 Mcf Nat. 2,316 Mcf AF 1,175 psi/24 hrs. development Talcott pool Erie field	1,237 Mcf AF 1,025 psi/24 hrs. development Talcott pool Erie field	1,274 Mcf Nat. 6,343 Mcf AF 1,025 psi/24 hrs. development Waterford pool LeBoeuf field	1,073 Mcf AF 1,125 psi/24 hrs. development Waterford pool LeBoeuf field	39 Mcf Nat. 622 Mcf AF 1,100 psi/24 hrs. development Waterford pool LeBoeuf field	33 Mcf Nat. 1,958 Mcf AF 1,125 psi/24 hrs. development Waterford pool LeBoeuf field	6,000 Mcf AF 1,020 psi/48 hrs. development Edinboro field	500 Mcf AF 1,050 psi 7[illegible] hr development Bushnell-Lexing[illegible] pool Conneaut [illegible]

Figure 35. *(Continued).*

COUNTY Permit Number	Erie 23246	Erie 23247	Erie 23248	Erie 23249	Erie 23250	Erie 23251	Erie 23253	Erie 23269	Erie 23271	Erie 23272
NAME OF WELL	Boss Oilfield #1	J. Graves, Sr. #1	Rodney Smock #1	Holy Trinity Church of Albion #1	Michael Feuerwerker #2	James E. Marsh #1	Sergey & Dora Shchouchfoff #2	J. Arthur Williams #1	Skisuski #1	Earl Brace #A1
OPERATOR	Paco, Incorporated	Paco, Incorporated	Paco, Incorporated	Paco, Incorporated	Paco, Incorporated	NRM Petroleum Corporation	NRM Petroleum Corporation	Meridian Exploration #718	Meridian Exploration #678	NRM Petroleum Corporation
TOWNSHIP	Conneaut	Conneaut	Conneaut	Conneaut	Conneaut	Waterford	LeBoeuf	Washington	Washington	Waterford
QUADRANGLE	E. Springfield	Beaver Center	Beaver Center	Conneautville	Beaver Center	Cambridge Spgs., NE	Miller's Station	Edinboro North	Edinboro South	Cambridge Spgs., NE
LATITUDE	9,450 ft. S 41°55'00"	5,350 ft. S 41°52'30"	2,000 ft. S 41°52'30"	920 ft. S 41°52'30"	1,560 ft. S 41°52'30"	4,270 ft. S 42°00'00"	6,400 ft. S 41°52'30"	3,000 ft. S 41°55'00"	1,000 ft. S 41°52'30"	5,900 ft. S 42°00'00"
LONGITUDE	9,550 ft. W 80°22'30"	3,500 ft. W 80°22'30"	4,200 ft. W 80°22'30"	10,060 ft. W 80°20'00"	2,660 ft. W 80°22'30"	660 ft. W 80°02'30"	10,170 ft. W 79°55'00"	4,700 ft. W 80°07'30"	10,200 ft. W 80°07'30"	640 ft. W 80°02'30"
DATE COMPLETED	10-7-83	9-29-83	10-7-83	10-2-83	10-3-83	9-29-83	9-23-83	11-29-83	11-17-83	10-6-83
ELEVATION	859 GR	779 GR	938 GR	1000 GR	970 GR	1309 GR	1486 GR	1260 GR	1445 GR	1254 GR
LOGS RECEIVED AND LOGGED INTERVALS					FDC/CNL: 532-3549 GR/DLL/DIL: 532-3548 Laser: 3250-3470	FDC/T: 2000-3750 LL: 2000-3750 Laser: 3660-3680	DBC/GR: 2750-4470 IL: 2750-4474	LTD/GR: 50-3886 DLL: 3370-3874 PCL: 3550-3830	DBC/CNL: 2207-4214 DIL/DLL: 403-4314	FDC/GR: 2000-3742 IL: 2000-3743
TULLY	1692-	1918-	1848-	1902-	1874-	2082-	2782-	2195-	2494-	2048-
ONONDAGA LIMESTONE CHERT	1864-	2088-	2020-	2068-	2046-	2304-	3002-	2400-	2703-	2270-
ORISKANY	2128-	2336-	2268-	2262-				2676-	2964-	
HELDERBERG KEYSER-BASS ISLANDS	2148-	2360-	2286-		2310-	2554-	3214-	2682-	2971-	2464-
SALINA GUELPH-LOCKPORT	2234- 2748-	2430- 2940-	2362- 2894-	2390- 2944-	2384- 2936-	2627- 3160-	3280- 3866-	2750- 3286-	3035- 3596-	2542- 3112-
CLINTON IRONDEQUOIT	3016-	3208-	3162-	3224-	3200- 3256-	3417- 3474-	4122- 4191-	3544- 3591-	3856- 3907-	3396- 3446-
MEDINA GRIMSBY WHIRLPOOL	3112-	3308-	3260-	3312-	3280- 3453-	3516- 3664-	4225- 4394-	3632- 3788-	3942- 4110-	3488- 3640-
QUEENSTON	3288-	3486-	3438-	3490-	3457-	3675-	4408-	3794-	4116-	3650-
PRODUCING FORMATION	Medina	Medina	Medina	Medina	Medina	Medina	Medina	Medina	Medina	Medina
PRODUCING INTERVAL	3136-3217	3334-3424	3282-3344	3334-3436	3314-3396	3526-3586	4264-4345	3657-3707	3965-4015	3504-3593
TOTAL DEPTH	3367	3581	3537	3586	3555	3750	4480	3890	4216	3735
DEEPEST FORMATION REACHED	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston
RESULTS	400 Mcf AF 1,000 psi/72 hrs. development Bushnell-Lexington pool Conneaut field	1100 Mcf AF 1,000 psi/72 hrs. development Pennside pool Conneaut field	1,200 Mcf AF 1,100 psi/72 hrs. development Bushnell-Lexington pool Conneaut field	450 Mcf AF 850 psi/72 hrs. development Lundys Lane pool Conneaut field	200 Mcf AF 750 psi/72 hrs. development Bushnell-Lexington pool Conneaut field	900 Mcf Nat. 2,903 Mcf AF 1,150 psi/24 hrs. development Swails pool Drumlin field	84 Mcf Nat. 70 Mcf AF 1,000 psi/24 hrs. development Mill Village field	340 Mcf AF 1,020 psi/168 hrs. development Edinboro field	115 Mcf AF 1,030 psi/360 hrs. development Edinboro field	231 Mcf Nat. 5,537 Mcf AF 1,125 psi/24 hrs. development Swails pool Drumlin field

COUNTY Permit Number	Erie 23276	Erie 23277	Erie 23279	Erie 23280	Erie 23281	Erie 23282	Erie 23286	Erie 23287	Erie 23292	Erie 23293
NAME OF WELL	E. Hess #1	William Wurst #3	Joseph L. May #1	Max E. Brown #20	Anthony J. Wrona #1	Metro Sturko #2	Otto Allen #1Q	Cross & Company Contractors #1	Homer Laughery #1	John Balas #1
OPERATOR	Vineyard Oil & Gas Company	N.E.A. Cross Company	N.E.A. Cross Company	NRM Petroleum Corporation	NRM Petroleum Corporation	NRM Petroleum Corporation	Quaker State Resources	N.E.A. Cross Company	NRM Petroleum Corporation	NRM Petroleum Corporation
TOWNSHIP	McKean	LeBoeuf	LeBoeuf	LeBoeuf	LeBoeuf	LeBoeuf	Amity	Union	LeBoeuf	LeBoeuf
QUADRANGLE	Cambridge Spgs., NE	Miller's Station	Cambridge Spgs., NE	Miller's Station	Miller's Station	Miller's Station	Union City	Union City	Miller's Station	Miller's Station
LATITUDE	6,050 ft. S 42°00'00"	8,500 ft. S 41°52'30"	6,650 ft. S 41°55'00"	6,080 ft. S 41°52'30"	5,900 ft. S 41°52'30"	2,250 ft. S 41°52'30"	12,050 ft. S 42°00'00"	4,450 ft. S 41°55'00"	6,090 ft. S 41°52'30"	4,480 ft. S 41°52'30"
LONGITUDE	5,900 ft. W 80°02'30"	9,200 ft. W 79°52'30"	5,050 ft. W 80°00'00"	720 ft. W 79°55'00"	3,100 ft. W 79°55'00"	3,400 ft. W 79°55'00"	8,450 ft. W 79°50'00"	9,000 ft. W 79°50'00"	8,350 ft. W 79°52'30"	5,330 ft. W 79°52'30"
DATE COMPLETED	12-8-83	10-4-83	10-8-83	11-22-83	10-26-83	11-14-83	1-13-84	10-20-83	11-6-83	11-21-83
ELEVATION	1365 GR	1620 GR	1490 GR	1605 GR	1555 GR	1432 GR	1345 GR	1250 GR	1617 GR	1600 GR
LOGS RECEIVED AND LOGGED INTERVALS	LL: 1101-3813	OBC/CNL: 2654-4668	DBC/CNL: 2299-4298	DBC/GR: 2850-4634	OBC/GR: 2850-4548 IL: 2850-4550	DBC/GR: 2850-4418 IL: 2850-4420		OBC/CNL: 2168-4178	OBC/GR: 2900-4598 IL: 2900-4601	FOC/GD/T: 2850-4592
TULLY	2142-	2947-	2576-	2887-	2853-		2354-	2420-	2919-	2892-
ONONDAGA LIMESTONE CHERT	2360-	3176-	2800-	3110-	3077-	2924-	2589-	2660-	3146-	3116-
ORISKANY		3381-					2800-			
HELDERBERG KEYSER-BASS ISLANDS	2558-	3400-	3062-	3335-	3300-	3152-	2820- 2876-	2900-	3367-	3332-
SALINA GUELPH-LOCKPORT	2612- 3227-	3432- 4025-	3100- 3666-	3397- 3970-	3361- 3938-	3220- 3791-	2897- 3441-	2960- 3528-	3429- 4003-	3394- 3974-
CLINTON IRONDEQUOIT	3439- 3546-	4295- 4352-	3925- 3988-	4230- 4298-	4200- 4264-	4054- 4121-	3644- 3760-	3786- 3850-	4254- 4324-	4237- 4306-
MEDINA GRIMSBY WHIRLPOOL	3572- 3742-	4391- 4554-	4011- 4188-	4338- 4500-	4298- 4464-	4162- 4321-	3816- 3950-	3875- 4048-	4365-	4346- 4503-
QUEENSTON	3750-	4564-	4198-	4513-	4479-	4336-	3962-	4062-	4524-	4517-
PRODUCING FORMATION	Medina	Medina	Medina	Medina	Medina	Medina	Medina	Medina	Medina	Medina
PRODUCING INTERVAL	3609-3745	4425-4458	4075-4132	4364-4430	4355-4402	4186-4264	3817-3962	3941-3974	4395-4460	4371-4457
TOTAL DEPTH	3818	4680	4300	4635	4560	4430	4116	4180	4605	4620
DEEPEST FORMATION REACHED	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston
RESULTS	1,500 Mcf AF 1,050 psi/96 hrs. extension Reeds Corners field	7,000 Mcf AF 1,200 psi/48 hrs. development New Ireland field	4,000 Mcf AF 900 psi/48 hrs. development Mill Village field	1,517 Mcf AF 1,200 psi/24 hrs. development New Ireland field	60 Mcf Nat. 163 Mcf AF 990 psi/96 hr., development New Ireland field	876 Mcf Nat. 155 Mcf AF 1,025 psi/72 hrs. development New Ireland field	1,500 Mcf AF 850 psi/48 hrs. development Waterford pool LeBoeuf field	4,200 Mcf AF 1,200 psi/48 hrs. extension Emmons pool Union City field	3,000 Mcf Nat. 3,491 Mcf AF 1,200 psi/24 hrs., development New Ireland field	84 Mcf Nat 467 Mcf AF 1,100 psi/72 hr developme New Irel field

Figure 35. *(Continued).*

COUNTY Permit Number	Erie 23294	Erie 23297	Erie 23298	Erie 23299	Erie 23313	Erie 23324	Erie 23325	Erie 23326	Erie 23335	Erie 23347
NAME OF WELL	Clifford & Hazel Brown #2C	Julia D. Brown #2E	Roy E. Laughery #2A	Roy E. Laughery #1A	Nick & Elizabeth Artello #1	Hotchkiss #1	William Karmazon #1	William Lyons #1	Fort LeBoeuf School District #1	George & Helen Pulakos #1
OPERATOR	NRM Petroleum Corporation	NRM Petroleum Corporation	NRM Petroleum Corporation	NRM Petroleum Corporation	Tetra Energy Group, Ltd.	Paco, Incorporated	N.E.A. Cross Company	N.E.A. Cross Company	N.E.A. Cross Company	N.E.A. Cross Company
TOWNSHIP	LeBoeuf	LeBoeuf	LeBoeuf	LeBoeuf	Elk Creek	Elk Creek	Waterford	Waterford	Waterford	LeBoeuf
QUADRANGLE	Miller's Station	Miller's Station	Miller's Station	Miller's Station	Conneautville	Edinboro South	Cambridge Spgs., NE	Waterford	Waterford	Waterford
LATITUDE	3,990 ft. S 41°52'30"	6,050 ft. S 41°52'30"	7,080 ft. S 41°52'30"	5,860 ft. S 41°52'30"	60 ft. S 41°52'30"	6,640 ft. S 41°52'30"	2,000 ft. S 41°57'30"	2,300 ft. S 41°57'30"	3,050 ft. S 41°57'30"	4,650 ft. S 41°55'00"
LONGITUDE	10,710 ft. W 79°52'30"	7,160 ft. W 79°55'00"	11,150 ft. W 79°52'30"	10,580 ft. W 79°52'30"	240 ft. W 80°17'30"	3,400 ft. W 80°12'30"	5,750 ft. W 80°02'30"	11,050 ft. W 79°55'00"	7,500 ft. W 79°57'30"	8,950 ft. W 79°57'30"
DATE COMPLETED	12-7-83	12-1-83	11-16-83	11-10-83	9-30-83	10-17-83	10-21-83	10-28-83	11-8-83	11-4-83
ELEVATION	1551 GR	1570 GR	1608 GR	1602 GR	1210 GR	1210 GR	1465 GR	1265 GR	1240 GR	1355 GR
LOGS RECEIVED AND LOGGED INTERVALS	FDC/GD/T: 2800-4540	GR/FDC: 2800-4562 GR/T: 2800-4562	FDC/GD: 2900-4612	FDC/T: 2850-4616	FDC/CNL: 2122-3787 GR/LL: 2121-3762 Laser: 3600-3790 CBL: 3000-3810		FDC/GR: 2400-4076	DBC/CNL: 1956-3952	OBC/CNL: 1764-3771	DBC/CNL: 2197-4204
TULLY	2829-	2854-	2910-	2892-	2178-	2250-	2416-	2202-	2117-	2484-
ONONDAGA LIMESTONE CHERT	3054-	3078-	3132-	3116-	2372-	2452-	2632-	2436-	2340-	2708-
ORISKANY						2634-				
HELDERBERG KEYSER-BASS ISLANDS	3276-	3359-	3360-	3341-	2632-		2836-	2690-	2602-	2964-
SALINA GUELPH-LOCKPORT	3351- 3899-	3412- 3934-	3422- 3988-	3404- 3965-	2707- 3256-	2778- 3334-	2901- 3452-	2773- 3334-	2679- 3261-	3002- 3541-
CLINTON IRONDEQUOIT	4169- 4238-	4202- 4266-	4244- 4313-	4227- 4296-	3506- 3561-	3604-	3726- 3774-	3569- 3636-	3517- 3568-	3809- 3878-
MEDINA GRIMSBY WHIRLPOOL	4277- 4438-	4298- 4466-	4354- 4515-	4336- 4496-	3595- 3761-	3702-	3796- 3967-	3660- 3834-	3591- 3710-	3901- 4080-
QUEENSTON	4452-	4478-	4529-	4511-	3767-	3882-	3975-	3842-	3716-	4090-
PRODUCING FORMATION	Medina	Medina	Medina	Medina	Medina	Medina	Medina	Medina	Medina	Medina
PRODUCING INTERVAL	4329-4403	4344-4418	4384-4463	4365-4454	3638-3698	3738-3790	3850-3884	3729-3778	3663-3692	3970-4030
TOTAL DEPTH	4560	4562	4655	4626	3790	3955	4096	3962	3773	4210
DEEPEST FORMATION REACHED	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston
RESULTS	84 Mcf Nat. 311 Mcf AF 1,200 psi/72 hrs. development New Ireland field	133 Mcf Nat. 700 Mcf AF 1,100 psi/72 hrs. development New Ireland field	119 Mcf Nat. 1,517 Mcf AF 1,225 psi/24 hrs. development New Ireland field	133 Mcf Nat. 152 Mcf AF 1,090 psi/96 hrs. development New Ireland field	200 Mcf AF 900 psi/24 hrs. development Lundys Lane pool Conneaut field	500 Mcf AF 1,000 psi/72 hrs. development Pageville pool Conneaut field	2,000 Mcf AF 1,100 psi/48 hrs. development Reeds Corners field	2,000 Mcf AF 1,100 psi/48 hrs. development Waterford pool LeBoeuf field	1,100 Mcf AF 1,120 psi/48 hrs. development Waterford pool LeBoeuf field	3,000 Mcf AF 650 psi/48 hrs. development Mill Village field

COUNTY Permit Number	Erie 23386	Erie 23389	Erie 23391	Erie 23394	Erie 23395	Erie 23396	Erie 23397	Erie 23398	Erie 23400	Erie 23429
NAME OF WELL	M. Reed #1	Doris Hakkarainen #2	Peter George #1	James Jankowiak #1	Oelbert O. Porter #1	Troyer Brothers, Incorporated #1	Hibbard H. Swan #1	Richard Fenno #1	George Nick #1	John Flanigan #1
OPERATOR	Vineyard Oil & Gas Company	N.E.A. Cross Company	N.E.A. Cross Company	N.E.A. Cross Company	NRM Petroleum Corporation	NRM Petroleum Corporation	NRM Petroleum Corporation	NRM Petroleum Corporation	N.E.A. Cross Company	Meridian Exploration #735
TOWNSHIP	McKean	Waterford	Waterford	LeBoeuf	LeBoeuf	Amity	Amity	Amity	Waterford	LeBoeuf
QUADRANGLE	Cambridge Spgs., NE	Cambridge Spgs., NE	Cambridge Spgs., NE	Miller's Station	Miller's Station	Union City	Union City	Union City	Cambridge Spgs., NE	Cambridge Springs
LATITUDE	8,400 ft. S 42°00'00"	11,950 ft. S 42°00'00"	11,100 ft. S 42°00'00"	5,900 ft. S 41°52'30"	7,090 ft. S 41°52'30"	12,090 ft. S 42°00'00"	250 ft. S 42°00'00"	3,075 ft. S 41°57'30"	7,350 ft. S 42°00'00"	5,700 ft. S 41°52'30"
LONGITUDE	6,200 ft. W 80°05'00"	4,350 ft. W 80°00'00"	3,550 ft. W 80°00'00"	8,350 ft. W 79°55'00"	3,780 ft. W 79°52'30"	4,920 ft. W 79°45'00"	6,680 ft. W 79°45'00"	2,950 ft. W 79°47'30"	5,350 ft. W 80°00'00"	7,900 ft. W 80°00'00"
DATE COMPLETED	12-3-83	11-19-83	11-20-83	12-18-83	12-1-83	12-8-83	1-29-84	1-1-84	11-12-83	12-16-83
ELEVATION	1380 GR	1300 GR	1345 GR	1545 GR	1665 GR	1489 GR	1670 GR	1460 GR	1485 GR	1425 GR
LOGS RECEIVED AND LOGGED INTERVALS	Cyberlook: 1996-3850 GR: 3550-3850	DBC/CNL: 2047-3878	OBC/CNL: 1897-3909	DBC/CNL: 2471-4584	DBC/GR: 2950-4704 T/GR: 2950-4704	DBC/T: 2550-4273 GO/IL: 2550-4273	DBC/T: 2750-4503	OBC/GR: 2550-4303	OBC/CNL: 1994-4016	OBC/CNL: 2300-4361 LL: 3470-4361
TULLY	2220-	2129-	2154-	2838-	3002-	2572-	2784-	2577-	2264-	2628-
ONONDAGA LIMESTONE CHERT	2434-	2350-	2380-	3062-	3239-	2814-	3024-	2817-	2480-	2844- Bois Blanc 3028-3097
ORISKANY	2738-									Absent
HELDERBERG KEYSER-BASS ISLANDS	2762- 2772-	2508- 2551-	2514- 2582-	3276-	3441-	3027-	3234-	3038-	2634- 2680-	3097-
SALINA GUELPH-LOCKPORT	2848- 3268-	2612- 3245-	2636- 3278-	3336- 3922-	3497- 4081-	3110- 3654-	3282- 3865-	3098- 3650-	2721- 3374-	3162- 3740-
CLINTON IRONDEQUOIT	3588-	3502- 3561-	3540- 3594-	4192- 4248-	4336- 4406-	3918- 3974-	4136- 4188-	3901- 3972-	3644- 3692-	4008 4063-
MEDINA GRIMSBY WHIRLPOOL	3610- 3780-	3584- 3756-	3616- 3786-	4272- 4447-	4451- 4604-	4010- 4167-	4222- 4380-	4012- 4166-	3714- 3883-	4086- 4264-
QUEENSTON	3791-	3765-	3797-	4460-	4619-	4182-	4392-	4171-	3891-	4275-
PRODUCING FORMATION	Medina	Medina	Medina	Medina	Medina	Medina	Medina	Medina	Medina	Medina
PRODUCING INTERVAL	3638-3788	3664-3700	3686-3710	4342-4400	4474-4525	4033-4127	4247-4312	4035-4125	3788-3800	4129-4
TOTAL DEPTH	3873	3896	3920	4625	4728	4295	4505	4310	4025	437
DEEPEST FORMATION REACHED	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	Queen
RESULTS	200 Mcf AF 700 psi/240 hrs. development Reeds Corners field	500 Mcf AF 1,000 psi/48 hrs. development Swails pool Drumlin field	1,000 Mcf AF 1,050 psi/48 hrs. development Swails pool Drumlin field	300 Mcf AF 800 psi/48 hrs. development New Ireland field	179 Mcf Nat. 270 Mcf AF 1,025 psi/72 hrs. development New Ireland field	622 Mcf AF 1,100 psi/72 hrs. development Corry field	1,356 Mcf AF 1,060 psi/72 hrs. development Corry field	1,03[illegible] Mcf AF 1,125 psi/? hrs. development Alder Run field	3,900 Mcf AF 1,100 psi/48 hrs. development Swails pool Drumlin field	292 Mcf AF 1,170 psi [illegible] development Edinboro Nor fiel

Figure 35. *(Continued).*

COUNTY Permit Number	Erie 23430	Erie 23476	Erie 23494	Erie 23508	Erie 23543	Erie 23545	Erie 23549	Erie 23557	Erie 23558	Erie 23560
NAME OF WELL	J. Arthur Williams #1	Northwestern School District #1	John Gocal #3	Mitchell-Kestle #1	John Gocal #2	Paul T. Serwinski #1	Kulesa-Risjan #1	Francis Richards #1	Grucza #1	Tracy #1
OPERATOR	Meridian Exploration #717	N.E.A. Cross Company	N.E.A. Cross Company	NRM Petroleum Corporation	N.E.A. Cross Company	NRM Petroleum Corporation	NRM Petroleum Corporation	N.E.A. Cross Company	Vineyard Oil & Gas Company	Vineyard Oil & Gas Company
TOWNSHIP	Washington	Conneaut	LeBoeuf	Waterford	LeBoeuf	Waterford	Waterford	Waterford	Waterford	Waterford
QUADRANGLE	Edinboro North	Albion	Miller's Station	Cambridge Spgs., NE	Miller's Station	Cambridge Spgs., NE	Waterford	Cambridge Spgs., NE	Cambridge Spgs., NE	Cambridge Spgs., NE
LATITUDE	11,850 ft. S 41°57'30"	11,620 ft. S 41°55'00"	5,050 ft. S 41°52'30"	11,900 ft. S 42°00'00"	4,600 ft. S 41°52'30"	9,950 ft. S 42°00'00"	13,090 ft. S 42°00'00"	11,800 ft. S 42°00'00"	9,300 ft. S 41°57'30"	1,500 ft. S 42°00'00"
LONGITUDE	1,450 ft. W 80°07'30"	4,660 ft. W 80°20'00"	4,450 ft. W 79°55'00"	1,330 ft. W 80°00'00"	250 ft. W 79°55'00"	2,900 ft. W 80°00'00"	7,680 ft. W 79°55'00"	300 ft. W 80°00'00"	6,700 ft. W 80°02'30"	11,000 ft. W 80°00'00"
DATE COMPLETED	12-8-83	11-29-83	12-16-83	12-29-83	12-22-83	1-4-84	1-6-84	1-12-84	1-3-84	1-12-84
ELEVATION	1260 GR	1006 GR	1490 GR	1309 GR	1540 GR	1449 GR	1450 GR	1340 GR	1540 GR	1465 GR
LOGS RECEIVED AND LOGGED INTERVALS	DBC/CNL: 1886-3900 DIL/DLL: 404-3900 PCL: 3666-3712	FDC/GR: 1870-3576	DBC/GR: 2740-4523	DBC/GR: 2005-2646 LL: 2005-2641 Laser: 2500-2625	DBC/GR: 2812-4541	DBC/GR: 1992-2682	FDC/GD: 2300-3943 PCL: 3821-3917	DBC/GR: 2110-3886	DBC/CNL: 419-4160 Laser: 3897-4110	DBC/CNL: 400-3900 Laser: 2450-2808
TULLY	2225-	1883-	2778-	2104-	2834-	2221-	2330-	2126-	2534-	2226-
ONONDAGA LIMESTONE CHERT	2434-	2062-	3004-	2326-	3060-	2434-	2560-	2348-	2748-	2450-
ORISKANY										
HELDERBERG KEYSER-BASS ISLANDS	2703-	2336-	3230-	2552-	3288-	2670-	2810-	2584- 2618-	3014-	2556- 2648-
SALINA GUELPH-LOCKPORT	2772- 3300-	2406- 2952-	3292- 3866-		3334- 3916-		2840- 3453-	2756- 3252-	3079- 3626-	2708- 3323-
CLINTON IRONDEQUOIT	3550- 3602-	3204- 3258-	4157- 4192-		4186- 4242-		3686- 3753-	3500- 3561-	3837- 3894-	3561- 3618-
MEDINA GRIMSBY WHIRLPOOL	3634- 3602-	3300- 3458-	4216- 4394-		4279- 4442-		3787-	3594- 3752-	3916- 4093-	3640- 3810-
QUEENSTON	3803-	3464-	4407-		4460-			3760-	4098-	3820-
PRODUCING FORMATION	Medina	Medina	Medina	Helderberg	Medina	Bass Islands	Medina	Medina	Medina	Medina
PRODUCING INTERVAL	3666-3712	3333-3404	4282-4353		4324-4394		3821-3917	3630-3670	3945-4034	3646-3816
TOTAL DEPTH	3907	3589	4430	2648	4497	2686	3949	3897	4175	3910
DEEPEST FORMATION REACHED	Queenston	Queenston	Queenston	Helderberg	Queenston	Bass Islands	Medina	Queenston	Queenston	Queenston
RESULTS	189 Mcf AF 1,080 psi/240 hrs. development Edinboro field	500 Mcf AF 1,000 psi/48 hrs. development Lundys Lane pool Conneaut field	1,500 Mcf AF 1,160 psi/48 hrs. development New Ireland field	23,000 Mcf Nat. 925 psi/24 hrs. development Greenley pool Drumlin field	500 Mcf AF 1,100 psi/48 hrs. development New Ireland field	27,000 Mcf Nat. 810 psi/48 hrs. development Greenley pool Drumlin field	1,739 Mcf AF 1,140 psi/72 hrs. development Talcott pool Erie field	1,900 Mcf AF 1,100 psi/48 hrs. development Swails pool Drumlin field	2,500 Mcf AF 1,050 psi/96 hrs. development Reeds Corners field	1,500 Mcf AF 1,125 psi/96 hrs. development Swails pool Drumlin field

COUNTY Permit Number	Erie 23561	Erie 23580	Erie 23592	Erie 23595	Erie 23596	Erie 23607	Erie 23608	Erie 23628	Erie 23632	Erie 23682
NAME OF WELL	Antell #1	L. Whitesel #1	Rutkowski #3	Richard Hill #1	Kuhns/Stutzman #1	John J. Crane #2	William Wurst #4	Jack Snyder #1	Robert Hill #2	F. Starvaggi #3
OPERATOR	Vineyard Oil & Gas Company	Envirogas, Incorporated	Vineyard Oil & Gas Company	N.E.A. Cross Company	N.E.A. Cross Company	N.E.A. Cross Company	N.E.A. Cross Company	N.E.A. Cross Company	N.E.A. Cross Company	Envirogas, Incorporated
TOWNSHIP	LeBoeuf	North East	Waterford	Waterford	Waterford	LeBoeuf	LeBoeuf	Waterford	Waterford	Greenfield
QUADRANGLE	Cambridge Spgs., NE	North East	Cambridge Spgs., NE	Cambridge Spgs., NE	Waterford	Cambridge Springs	Miller's Station	Cambridge Spgs., NE	Cambridge Spgs., NE	Wattsburg
LATITUDE	10,700 ft. S 41°55'00"	7,050 ft. S 42°12'30"	11,400 ft. S 41°57'30"	10,050 ft. S 42°00'00"	12,700 ft. S 42°00'00"	750 ft. S 41°52'30"	6,850 ft. S 41°52'30"	9,500 ft. S 42°00'00"	9,850 ft. S 42°00'00"	5,450 ft. S 42°07'30"
LONGITUDE	7,500 ft. W 80°00'00"	6,750 ft. W 79°50'00"	3,400 ft. W 80°02'30"	850 ft. W 80°00'00"	8,550 ft. W 79°57'30"	2,250 ft. W 80°00'00"	6,950 ft. W 79°52'30"	3,100 ft. W 80°00'00"	350 ft. W 80°00'00"	8,350 ft. W 79°45'00"
DATE COMPLETED	12-22-83	1-7-84	12-27-83	1-4-84	2-7-84	12-20-83	2-14-84	1-30-84	2-24-84	2-8-84
ELEVATION	1520 GR	890 GR	1520 GR	1390 GR	1215 GR	1400 GR	1660 GR	1445 GR	1370 GR	1365 GR
LOGS RECEIVED AND LOGGED INTERVALS	DBC/CNL: 468-4322 Laser: 4090-4290		DBC/CNL: 404-4184 DIL/DLL: 453-4185		DBC/CNL: 1800-3818	FDC/CNL: 2320-4334	DBC/CNL: 2600-4627	DBC/GR: 2230-3394	DBC/CNL: 1951-3947	
TULLY	2650-	1388-	2548-	2177-	2041-	2590-	2920-	2270-	2194-	2106-
ONONDAGA LIMESTONE CHERT	2872-	1610-	2765-	2397-	2266-	2813-	3151-	2487-	2416-	2334-
ORISKANY		1862-					3362-			
HELDERBERG KEYSER-BASS ISLANDS	3138-	1868-	3020-	2550-	2525-	3062-	3382-	2594- 2684-	2654- 2705-	2572-
SALINA GUELPH-LOCKPORT	3208- 3744-	1960- 2300-	3082- 3594-		2616- 3156-	3127- 3706-	3422- 3994-	2710- 3376-	2814- 3330-	2673- 3048-
CLINTON IRONDEQUOIT	4013 4068-	2569- 2623-	3862- 3918-		3428- 3486-	3965- 4021-	4250- 4319-	3634- 3691-	3568- 3627-	3303- 3368-
MEDINA GRIMSBY WHIRLPOOL	4090- 4265-	2668- 2800-	3940- 4114-		3521- 3682-	4057- 4218-	4360- 4521-	3714- 3886-	3648- 3821-	3402- 3540-
QUEENSTON	4276-	2816-	4120-		3690-	4234-	4533-	3894-	3830-	3560-
PRODUCING FORMATION	Medina	Medina	Medina	Bois Blanc	Medina	Medina	Medina	Medina	Medina	Medina
PRODUCING INTERVAL	4103-4269	2704-2807	3975-4048		3591-3628	4130-4158	4410-4460	3763-3828	3713-3767	3420-3554
TOTAL DEPTH	4325	2904	4186	2698	3820	4345	4654	4009	3944	36
DEEPEST FORMATION REACHED	Queenston	Queenston	Queenston	Bass Islands	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston
RESULTS	1,200 Mcf AF 1,070 psi/96 hrs. development Edinboro North field	2,000 Mcf AF 700 psi/240 hrs. development Burgess pool North East field	1,900 Mcf AF 1,050 psi/96 hrs. development Edinboro North field	2,200 Mcf AF 810 psi/2 hrs. development Greenley pool Drumlin field	2,000 Mcf AF 1,100 psi/48 hrs. development Talpot pool Erie field	200 Mcf AF 800 psi/48 hrs. development Edinboro North field	4,100 Mcf AF 1,250 psi/48 hrs. development New Ireland field	2,100 Mcf AF 1,100 psi/48 hrs. development Swails pool Drumlin field	2,100 Mcf AF 1,100 psi/48 hrs. development Swails pool Drumlin field	1,000 Mcf AF 1,07 psi/48 hrs. development Bull Reach pool North East Field

Figure 35. *(Continued).*

COUNTY Permit Number	Erie 23765	Erie 23780	Erie 23853	Erie 23917	Erie 23963	Erie 23983	Erie 23984	Erie 24005	Erie 24031	Indiana 27558
NAME OF WELL	Brumagin #1	Wilbur & Ila Sanford #1	Burbules-Steve #1	Harry Drury #1	Byrtus #2	Durst #1	Zaenglein #1	Donald Rice #1	Leonard Alcorn #1	Melissa Dunlap #1
OPERATOR	Robert H. Brace	Old Mountain Gas, Inc.	Robert H. Brace	Paco, Incorporated	Meridian Exploration #750	Vineyard Oil & Gas Company	Vineyard Oil & Gas Company	Kaltsas Oil Company, Inc.	Kaltsas Oil Company, Inc.	Felmont Oil Corp. #F-345
TOWNSHIP	Waterford	Waterford	Waterford	Conneaut	Washington	Venango	McKean	Greenfield	Greenfield	Green
QUADRANGLE	Cambridge Spgs., NE	Cambridge Spgs., NE	Cambridge Spgs., NE	East Springfield	Cambridge Spgs., NE	Wattsburg	Cambridge Spgs., NE	Wattsburg	Wattsburg	Barnesboro
LATITUDE	6,350 ft. S 42°00'00"	6,250 ft. S 42°00'00"	13,350 ft. S 42°00'00"	8,010 ft. S 41°55'00"	1,700 ft. S 41°55'00"	13,350 ft. S 42°05'00"	3,500 ft. S 42°00'00"	7,950 ft. S 42°07'30"	4,600 ft. S 42°07'30"	13,500 ft. S 40°42'30"
LONGITUDE	11,200 ft. W 80°00'00"	8,435 ft. W 80°00'00"	3,150 ft. W 80°00'00"	10,230 ft. W 80°22'30"	6,250 ft. W 80°02'30"	4,300 ft. W 79°47'30"	3,250 ft. W 80°02'30"	3,550 ft. W 79°50'00"	7,150 ft. W 79°47'30"	7,400 ft. W 78°50'00"
DATE COMPLETED	3-2-84	6-23-84	3-14-84	7-21-84	7-22-84	6-13-84	6-21-84	7-1-84	7-10-84	7-10-83
ELEVATION	1250 GR	1385 GR	1375 GR	876 GR	1455 GR	1490 GR	1245 GR	1429 GR	1381 GR	1742 GR
LOGS RECEIVED AND LOGGED INTERVALS					FDC/GR: 0-4186 DIL/GR: 2450-4186		FDC/CNL: 360-3679 LL/GR: 448-3675 Laser: 2216-3682			FDC/GR: 0-8357
TULLY	2244-	2181-	2174-	1690-	2526-	2341-	1998-	2138-	2114-	7354-
LIMESTONE ONONDAGA CHERT	2264-	2400-	2394-	1860-	2740-	2577-	2218-	2322-	2347-	8170- 8196-
ORISKANY	2520-		2650-	2118-		Absent	2468-	2536-	2541-	8298-
HELDERBERG KEYSER-BASS ISLANDS		2610-		2148-	3000-		2488-			8310-
SALINA GUELPH-LOCKPORT	2990-	3195- 3300-		2228- 2740-	3068- 3576-	3230- 3350-	2572- 3080-	2562- 3077-	2568- 3012-	
CLINTON IRONDEQUOIT		3500-		3012-	3840- 3902-	3598-	3325- 3386-	3399-	3366-	
MEDINA GRIMSBY WHIRLPOOL	3456- 3640-	3625- 3760-		3104-	3924- 4096-	3728- 3792- 3842-	3424- 3588-	3430- 3539- 3574-	3388- 3503- 3540-	
QUEENSTON	3650-	3780-		3281-	4104-	3856-	3596-	3590-	3557-	
PRODUCING FORMATION	Medina	Medina	Bois Blanc	Medina	Medina	Medina	Medina	Medina	Medina	Huntersville Ridgeley
PRODUCING INTERVAL	3509-3559	3397-3712		3148-3183	3975-4008	3733-3853	3456-3581	3451-3587	3438-3555	8198-8309
TOTAL DEPTH	3730	3865	2655	3356	4212	3965	3695	3730	3650	8353
DEEPEST FORMATION REACHED	Queenston	Queenston	Oriskany	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	Helderberg
RESULTS	2,000 Mcf AF 1,075 psi/120 hrs. development Swails pool Drumlin field	475 Mcf AF 1,050 psi/72 hrs. development Swails pool Drumlin field	4,000 Mcf Nat. 750 psi/? hrs. development Greenley pool Drumlin field	350 Mcf AF 1,000 psi/72 hrs. development Bushnell-Lexington pool Conneaut field	60 Mcf Nat. 270 Mcf AF 1,140 psi/216 hrs. development Edinboro North field	1,500 Mcf AF 1,050 psi/168 hrs. development Bailey Brook pool North East field	1,200 Mcf AF 1,100 psi/120 hrs. development Swails pool Drumlin field	100 Mcf AF 1,100 psi/72 hrs. development Hornby pool North East field	500 Mcf AF 1,100 psi/24 hrs. development Hornby pool North East field	297 Mcf AF 4,197 psi/520 hrs. development Lizowitz pool Strongstown field

COUNTY Permit Number	Mercer 20271	Mercer 20326	Mercer 20327	Mercer 20328	Mercer 20347	Mercer 20352	Mercer 20401	Mercer 20403	Mercer 20458	Mercer 20509
NAME OF WELL	Sember #2	Nystrom #1	Wilson #1	C. Morrison #1	Foltz #1	Van-Zanten #1	L. Jacobs #1	R. Muschick #1	James Bowmer #6247	W. F. Klein #1
OPERATOR	Atlas Resources, Incorporated	Atlas Resources, Incorporated	Atlas Resouces, Incorporated	P.N.B. Petroleum Corp. #HB-221-8	Atlas Resouces, Incorporated	Atlas Resources, Incorporated	P.N.B. Petroleum Corp. #HB-221-21	P.N.B. Petroleum Corp. #HB-221-8	National Fuel Gas Supply Corp.	Mitchell Energy Corporation
TOWNSHIP	S. Pymatuning	S. Pymatuning	S. Pymatuning	French Creek	S. Pymatuning	S. Pymatuning	French Creek	French Creek	Worth	Mill Creek
QUADRANGLE	Orangeville	Sharpsville	Sharpsville	New Lebanon	Sharpsville	Sharpsville	New Lebanon	New Lebanon	Sandy Lake	New Lebanon
LATITUDE	8,450 ft. S 41°20'00"	8,850 ft. S 41°20'00"	13,000 ft. S 41°20'00"	8,900 ft. S 41°27'30"	6,500 ft. S 41°20'00"	10,850 ft. S 41°20'00"	700 ft. S 41°27'30"	2,600 ft. S 41°27'30"	9,200 ft. S 41°17'30"	4,950 ft. S 41°25'00"
LONGITUDE	1,050 ft. W 80°30'00"	9,550 ft. W 80°27'30"	8,600 ft. W 80°27'30"	1,100 ft. W 80°05'00"	9,600 ft. W 80°27'30"	9,450 ft. W 80°27'30"	8,100 ft. W 80°02'30"	700 ft. W 80°05'00"	3,400 ft. W 80°00'00"	5,050 ft. W 80°00'00"
DATE COMPLETED	8-21-81	10-17-81	9-27-81	12-4-81	11-22-81	11-15-81	3-21-82	3-10-82	5-16-83	2-4-83
ELEVATION	1042 GR	1050 GR	1040 GR	1460 GR	978 GR	1054 GR	1420 GR	1402 GR	1441 GR	1495 GR
LOGS RECEIVED AND LOGGED INTERVALS	GR/DBC: 0-5006 LL: 2900-5000		GR/GD: 600-5070 3-D Vel/GR: 420-3000	FDC/CNL: 0-5655 DLL: 532-5642	DBC/GR: 0-5012		DBC/GR: 0-5549 GR/GD: 550-5543	GR/DBC: 0-5534 GR/GD: 0-5530	DBC/GR: 0-5968 GR/LL: 3800-5958 GR/T: 3800-5974	CNL/DBC: 604-5893 LL: 604-5890
TULLY	2886-		2938-	3725-	2832-		3632-	3602-	3958-	3901-
ONONDAGA LIMESTONE CHERT	3096-	3114-	3152-	3912-	3050-	3150-	3828-	3798-	4168-	4100-
ORISKANY	3307-	3318-	3354-	4065-	3254-	3352-	3976-	3944-		4228-
HELDERBERG KEYSER-BASS ISLANDS	3318- 3350-	3332-	3372- 3409-	4104- 4177-	3265- 3343-	3369-	3996- 4070-	3989- 4059-	4326- 4362-	4276- 4346-
SALINA GUELPH-LOCKPORT	3462- 4300-	3480- 4324-	3522- 4356-	4209- 4948-	3410- 4270-	3515- 4380-	4128- 4884-	4096 4868-	4466- 5282-	4380- 5182-
CLINTON IRONDEQUOIT	4626- 4676-	4614- 4680-	4640- 4723-	5240- 5315-	4534- 4604-	4647- 4723-	5153- 5248-	5124- 5206-	5583- 5692-	5462- 5611-
MEDINA GRIMSBY WHIRLPOOL	4742- 4931-	-4858 4940-	4792- 4982-	5397- 5577-	4671- 4860-	-4899 4980-	5296- 5478-	5265- 5449-	Reedsville @ 5701-	5658- 5794-
QUEENSTON	4938-	4952-	4995-	5593-	4874-	4991-	5488-	5460-		5806-
PRODUCING FORMATION	Medina	Medina	Medina	Medina	Medina	Medina	Medina	Medina	Newburg	
PRODUCING INTERVAL	4816-4936	4782-4850	4847-4992	5470-5508	4866-4778	4862-4896	5361-5412	5328-5379	5433-5481	
TOTAL DEPTH	5006	5098	5077	5665	5026	5160	5556	5540	[illegible]	[illegible]
DEEPEST FORMATION REACHED	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	Medina	Queenston
RESULTS	900 Mcf AF 600 psi/48 hrs. development Sharon Deep pool Sharon field	1,200 Mcf AF 1,240 psi/48 hrs. development Sharon Deep pool Sharon field	267 Mcf AF 1,400 psi/48 hrs. development Sharon Deep pool Sharon field	2,100 Mcf AF 1,500 psi/72 hrs. extension Kantz Corners field	260 Mcf AF 1,350 psi/48 hrs. extension Sharon Deep pool Sharon field	353 Mcf AF 1,350 psi/48 hrs. development Sharon Deep pool Sharon field	1,500 Mcf AF 1,530 psi/48 hrs. development Kantz Corners field	786 Mcf AF 1,500 psi/72 hrs. development Kantz Corners field	6.8 Mcf AF Formation damaged during stimulation P & A extension Black Run pool Wolf Creek field	Show of [illegible] 740 psi 144 [illegible] development New [illegible] p[illegible] [illegible] fie[illegible]

Figure 35. *(Continued).*

COUNTY Permit Number	Mercer 20516	Mercer 20519	Mercer 20520	Mercer 20521	Mercer 20524	Mercer 20525	Mercer 20526	Mercer 20527	Mercer 20533	Mercer 20534
NAME OF WELL	McConnell #1	E. Lashinsky #1	T. Piecknick #1	J. Van Meter #1	B. Shaw #2	D. Riley #1	D. Ray #1	G. Mitchell #1	M. Halliday #1	Planchak #1
OPERATOR	Mark Resources Corporation	R. D. Werner Co., Inc. #HB-222-44	P.N.B. Petroleum Corp. #HB-221-27	P.N.B. Petroleum Corp. #HB-221-48	P.N.B. Petroleum Corp. #HB-221-43	R. D. Werner Co., Inc. #HB-222-111	R. D. Werner Co., Inc. #HB-222-4	R. D. Werner Co., Inc. #HB-222-3	Mitchell Energy Corporation	Mark Resources Corporation
TOWNSHIP	Hermitage	Sugar Grove	French Creek	Deer Creek	Deer Creek	Sugar Grove	Sugar Grove	Sugar Grove	Lake	Hermitage
QUADRANGLE	Sharpsville	Greenville East	New Lebanon	New Lebanon	New Lebanon	Greenville East	Greenville East	Greenville East	Jackson Center	Sharpsville
LATITUDE	10,115 ft. S 41°17'30"	7,800 ft. S 41°30'00"	8,450 ft. S 41°27'30"	5,950 ft. S 41°27'30"	8,200 ft. S 41°27'30"	15,000 ft. S 41°30'00"	10,300 ft. S 41°30'00"	10,980 ft. S 41°30'00"	8,600 ft. S 41°17'30"	12,990 ft. S 41°17'30"
LONGITUDE	640 ft. W 80°25'00"	4,450 ft. W 80°20'00"	10,450 ft. W 80°02'30"	11,300 ft. W 80°05'00"	8,000 ft. W 80°05'00"	6,750 ft. W 80°20'00"	3,200 ft. W 80°20'00"	4,720 ft. W 80°20'00"	3,700 ft. W 80°07'30"	2,180 ft. W 80°25'00"
DATE COMPLETED	9-8-83	5-27-83	10-29-83	10-19-83	11-9-83	6-27-83	6-8-83	6-17-83	8-8-83	10-27-83
ELEVATION	1095 GR	1001 KB	1451 GR	1399 GR	1384 GR	997 GR	1021 GR	997 GR	1363 GR	1135 GR
LOGS RECEIVED AND LOGGED INTERVALS	GR/GD: 490-5356 Strata: 0-5364	GR/DBC/CNL: 0-4665 GR/GD: 500-4660	GR/PCL: 4825-5646	PCL: 4680-5494	DBC/GR: 0-5510 GR/GD: 600-5504	GR/CNL/DBC: 0-4700 GR/GD: 500-4694	GR/DBC: 0-4716 GR/GD: 400-4709	GR/DBC/CNL: 0-4693 GR/GD: 500-4690	DBC/CNL: 602-5903 GR/PCL: 3800-5854	GR/CNL/DBC: 0-5418 GR/GD: 570-5413 Strata: 750-5403
TULLY	3258-	2790-			3594-	2812-	2840-	2816-	3852-	3314-
ONONDAGA LIMESTONE ONONDAGA CHERT	3390-	2942-			3776-	2962-	2992-	2966-	4010-	3446-
ORISKANY	3564-	3138-			3934-	3158-	3188-	3162-	4147-	3621-
HELDERBERG KEYSER-BASS ISLANDS	3629- 3704-	3172- 3215-			3964- 3972-	3172- 3239-	3230- 3266-	3200- 3242-	4200- 4270-	3642- 3684-
SALINA GUELPH-LOCKPORT	3742- 4648-	3247- 4035-	4960-	4900-	4074- 4850-	3272- 4066-	3299- 4080-	3272- 4056-	4298- 5160-	3798- 4679-
CLINTON IRONDEQUOIT	4928- 4983-	4302- 4354-	5268- 5358-	5197- 5200-	5132- 5198-	4330- 4384-	4350- 4402-	4326- 4378-	5452- 5545-	4958- 5042-
MEDINA GRIMSBY WHIRLPOOL	5056- 5246-	4408- 4594-	5426- 5602-	5268- 5458-	5266- 5442-	4440- 4624-	4459- 4640-	4436- 4616-	5556- 5805-	5116- 5309-
QUEENSTON	5258-	4608-	5620-	5468-	5450-	4642-	4658-	4635-	5820-	5318-
PRODUCING FORMATION	Medina	Medina	Medina	Medina	Medina	Medina	Medina	Medina	Medina	Medina
PRODUCING INTERVAL	5123-5255	4446-4513	5466-5516	5318-5377	5330-5369	4481-4543	4508-4562	4481-4532	5636-5814	5179-5316
TOTAL DEPTH	5370	4672	5645	5485	5515	4710	4725	4705	5905	5435
DEEPEST FORMATION REACHED	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston
RESULTS	4,795 Mcf AF 1,400 psi/128 hrs. development Sharon Deep pool Sharon field	786 Mcf AF 1,490 psi/72 hrs. extension Osborn pool Sheakleyville field	1,400 Mcf AF 1,650 psi/72 hrs. development Kantz Corners field	2,500 Mcf AF 1,475 psi/72 hrs. development Kantz Corners field	1,200 Mcf AF 1,670 psi/72 hrs. development Kantz Corners field	786 Mcf AF 1,375 psi/72 hrs. development Osborn pool Sheakleyville field	1,000 Mcf AF 1,425 psi/72 hrs. development Osborn pool Sheakleyville field	1,100 Mcf AF 1,425 psi/72 hrs. development Osborn pool Sheakleyville field	412 Mcf AF 1,200 psi/140 hrs. Deeper pool discovery Filer Corners pool Coolspring field	185 Mcf AF 1,455 psi/336 hrs. development Sharon Deep pool Sharon field

COUNTY Permit Number	Mercer 20536	Mercer 20544	Mercer 20546	Mercer 20547	Mercer 20548	Mercer 20549	Mercer 20550	Mercer 20551	Mercer 20553	Mercer 20554
NAME OF WELL	R. Smith #2	M. Wasco #1	Polonsky #2	R. Smith #3	Dean Alexander Construction #2	J. Englert #2	John Oliver, III #1	P. Bartholomew #1	R. Muschick #2	L. Jacobs #2
OPERATOR	P.N.B. Petroleum Corp. #HB-221-7	Mitchell Energy Corporation	Mark Resources Corporation	P.N.B. Petroleum Corp. #HB-221-7	Mark Resources Corporation	P.N.B. Petroleum Corp. #HB-221-20	P.N.B. Petroleum Corp. #HB-221-5	Haddad and Brooks Inc. #HB-209-212	P.N.B. Petroleum Corp. #HB-221-18	P.N.B. Petroleum Corp. #HB-221-21
TOWNSHIP	Deer Creek	Greene	S. Pymatuning	Deer Creek	Hermitage	Deer & French Creeks	Deer Creek	Lackawannock	French Creek	French Creek
QUADRANGLE	Hadley	Greenville West	Orangeville	New Lebanon	Sharpsville	New Lebanon	Hadley	Greenfield	New Lebanon	New Lebanon
LATITUDE	6,900 ft. S 41°27'30"	11,750 ft. S 41°30'00"	7,700 ft. S 41°17'30"	3,000 ft. S 41°27'30"	10,850 ft. S 41°17'30"	14,300 ft. S 41°30'00"	11,050 ft. S 41°30'00"	2,440 ft. S 41°12'30"	4,400 ft. S 41°27'30"	420 ft. S 41°27'30"
LONGITUDE	900 ft. W 80°07'30"	9,200 ft. W 80°27'30"	350 ft. W 80°30'00"	10,800 ft. W 80°05'00"	500 ft. W 80°27'30"	3,300 ft. W 80°05'00"	6,150 ft. W 80°07'30"	8,600 ft. W 80°20'00"	300 ft. W 80°05'00"	9,640 ft. W 80°02'30"
DATE COMPLETED	11-19-83	8-29-83	10-16-83	10-8-83	11-5-83	11-30-83	1-22-84	5-17-84	12-18-83	1-11-84
ELEVATION	1359 GR	1112 GR	995 GR	1388 GR	992 GR	1422 GR	1381 GR	1287 GR	1441 GR	1386 GR
LOGS RECEIVED AND LOGGED INTERVALS	GR/CNL/PCL: 0-5401 CBL: 4400-5400	CNL/DBC: 416-4656	GR/CNL/DBC: 0-5076 GR/GD: 530-5070 Strata: 4450-5078	GR: 10-5458 GR/GD: 500-5472	GR/CNL/DBC: 0-5210 GR/GD: 550-5202 Strata: 550-5110	DBC/GR: 0-5490 GR/GD: 675-5482	DBC/GR: 0-5360 GR/GD: 500-5353	GR/DBC/CNL: 0-5792 GR/GD: 916-5786	DBC/GR: 0-5582 GR/GD: 650-5576	DBC/GR: 0-5497 GR/GD: 634-5492 Strata: 5200-5500
TULLY	3530-	2690-	2909-	3540-	2937-	3586-	3392-	3728-	3664-	3586-
ONONDAGA LIMESTONE CHERT	3708-	2890-	3116-	3720-	3214-	3780-	3564-	3858-	3854-	3780-
ORISKANY	3870-		3314-	3881-	3400-	3933-	3735-	4026-	4006-	3928-
HELDERBERG KEYSER-BASS ISLANDS	3899- 3903-	3103- 3178-	3334- 3385-	3916- 3988-	3460- 3537-	3962- 3966-	3757-	4050- 4104-	4038- 4046-	3970-
SALINA GUELPH-LOCKPORT	4030- 4802-	3210- 4002-	3400- 4380-	4022- 4812-	3570- 4462-	4070- 4832-	3859- 4714-	4216- 5096-	4149- 4916-	4074- 4846-
CLINTON IRONDEQUOIT	5070- 5134-	4282- 4334-	4668- 4720-	5098- 5154-	4764- 4855-	5122- 5186-	4932- 5046-	5386- 5451-	5168- 5308-	5119- 5188-
MEDINA GRIMSBY WHIRLPOOL	5198- 5382-	4389- 4570-	4794- 4985-	5214- 5404-	4890- 5080-	5246- 5428-	5104- 5292-	5530- 5726-	5330- 5508-	5246- 5429-
QUEENSTON	5390-	4580-	4996-	5414-	5093-	5438-	5302-	5737-	5522-	5439-
PRODUCING FORMATION	Medina	Medina	Medina	Medina	Medina	Medina	Medina	Medina	Medina	Medina
PRODUCING INTERVAL	5252-5295	4397-4577	4845-4905	5290-5339	4943-5091	5302-5354	5158-5253	5595-5652	5379-5429	5294-5360
TOTAL DEPTH	5458	4658	5080	5476	5220	5495	5365	5800	5591	5499
DEEPEST FORMATION REACHED	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston
RESULTS	962 Mcf AF 1,550 psi/72 hrs. development Kantz Corners field	400 Mcf AF 1,100 psi/96 hrs. extension Jamestown field	750 Mcf AF 1,290 psi/128 hrs. development Sharon Deep pool Sharon field	1,400 Mcf AF 1,475 psi/72 hrs. development Kantz Corners field	304 Mcf AF 1,475 psi/336 hrs. development Sharon Deep pool Sharon field	1,050 Mcf AF 1,550 psi/72 hrs. development Kantz Corners field	786 Mcf AF 1,400 psi/72 hrs. development Kantz Corner field	879 Mcf AF 1,500 psi/72 hrs. New field discovery Greenfield field	1,178 Mcf AF 1,450 psi/60 hrs. development Kantz Corners field	2,400 Mcf AF 1,550 psi/72 hrs. development Kantz Corners field

Figure 35. *(Continued).*

COUNTY Permit Number	Mercer 20555	Mercer 20557	Mercer 20558	Mercer 20577	Mercer 20586	Mercer 20591	Somerset 20127	Somerset 20129	Somerset 20131	Somerset 20135
NAME OF WELL	C. Morrison #1	W. Turner #1	J. Englert #3	Hart-Bailey #1	H. Miller #1	Hirschmann #1	Glenn W. Vought #1	H. George Doolittle Gas Unit #1	Commonwealth of PA (Hays) #1	Ray Hauger #1
OPERATOR	P.N.B. Petroleum Corp. #HB-221-16	P.N.B. Petroleum Corp. #HB-221-10	P.N.B. Petroleum Corp. #HB-221-20	Mark Resources Corporation	Cabot Oil & Gas Corporation	Mark Resources Corporation	Ashtola Production Company	Ashtola Production Company	Ashtola Production Company	Cabot Oil & Gas Corporation
TOWNSHIP	French Creek	Deer Creek	Deer & French Creeks	Hermitage	French Creek	Hermitage	Milford	Jefferson	Jefferson	Brothers Valley
QUADRANGLE	New Lebanon	Hadley	New Lebanon	Sharpsville	New Lebanon	Sharon East	Rockwood	Bakersville	Bakersville	Murdock
LATITUDE	7,000 ft. S 41°27'30"	9,200 ft. S 41°30'00"	15,030 ft. S 41°30'00"	7,950 ft. S 41°17'30"	7,150 ft. S 41°30'00"	3,680 ft. S 41°15'00"	10,750 ft. S 40°00'00"	8,990 ft. S 40°05'00"	8,850 ft. S 40°07'30"	3,900 ft. S 39°55'00"
LONGITUDE	1,700 ft. W 80°05'00"	7,650 ft. W 80°07'30"	7,140 ft. W 80°05'00"	11,300 ft. W 80°22'30"	4,500 ft. W 80°05'00"	5,080 ft. W 80°22'30"	9,510 ft. W 79°07'30"	9,920 ft. W 79°10'00"	5,000 ft. W 79°10'00"	9,410 ft. W 79°00'00"
DATE COMPLETED	12-12-83	11-23-83	12-7-83	3-3-84	6-3-84	3-26-84	8-24-83	10-12-83	3-15-84	8-18-84
ELEVATION	1449 GR	1380 GR	1457 GR	998 GR	1453 GR	1120 GR	2048 GR	2073 GR	2745 GR	2247 GR
LOGS RECEIVED AND LOGGED INTERVALS	DBC/GR: 0-5617 GR/GD: 660-5607	DBC/GR: 0-5336 GR/GD: 50-5331	GR/DBC: 628-5536 GR/GD: 628-5528	GR/CNL/DBC: 0-5247 GR/GD: 560-5239 GR/PCL: 4850-5236 Strata: 4920-5200	GR/DBC: 11-5201	GR/CNL/DBC:600-5496 GR/GD: 670-5490 GR/PCL: 5100-5354 Strata: 5200-5440	DBC/CNL/GR: 100-8812 DLL/GR: 6800-8805		LDT/CNL/GR: 100-8983 DLL/GR: 1750-8970 EPT: 7150-8967	DBC/CNL/GR: 0-8748 GR/GD: 1632-8740 GR/3-D VEL:0-8739 Strata: 3300-8740
TULLY	3700-	3392-	3600-	3154-	3555-	3398-	7706-	7483-	7940-	7595-
ONONDAGA LIMESTONE	3880-	3558-	3786-	3288-	3748-	3530-	8566-	8234-	8697-	8530-
ONONDAGA CHERT							8604-		8715-	8555-
ORISKANY	4036-	3730-	3946-	3462-		3704-	Ridgeley 8686-8780	8377-	Ridgeley 8840-	8630-
HELDERBERG KEYSER-BASS ISLANDS	4067- 4143-	3753-	3982- 4052-	3478- 3521-	3914- 4005-	3732- 3776-	8780-		Shriver 8928-	Shriver 8720-
SALINA GUELPH-LOCKPORT	4176- 4944-	3850- 4686-	4084- 4846-	3630- 4534-	4037- 4825-	3890- 4758-				
CLINTON IRONDEQUOIT	5210- 5317-	4964- 5022-	5153- 5214-	4790- 4873-	5100- 5156-	5044- 5130-				
MEDINA GRIMSBY WHIRLPOOL	5324- 5540-	5080- 5266-	5281- 5458-	4944- 5136-		5206- 5404-				
QUEENSTON	5554-	5280-	5470-	5150-		5411-				
PRODUCING FORMATION	Medina	Medina	Medina	Medina	Medina	Medina	Ridgeley		Ridgeley	
PRODUCING INTERVAL	5417-5462	5145-5208	5345-5388	4985-5058	5260-5361	5251-5328	8693-8774		8844-8922	
TOTAL DEPTH	5608	5349	5545	5260	5460	5520	8815	8475	8983	8787
DEEPEST FORMATION REACHED	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	Helderberg	Oriskany	Helderberg	Helderberg
RESULTS	962 Mcf AF 1,650 psi/72 hrs. development Kantz Corners field	497 Mcf AF 1,670 psi/72 hrs. development Kantz Corners field	786 Mcf AF 1,500 psi/72 hrs. development Kantz Corners field	335 Mcf AF 1,375 psi/72 hrs. development Sharon Deep pool Sharon field	1,670 Mcf AF 1,310 psi/48 hrs. development Kantz Corners field	313 Mcf AF 1,425 psi/72 hrs. extension Sharon Deep pool Sharon field	492 Mcf AF 850 psi/4d hrs. extension Kimmel field	15,000 Mcf Nat. downhole problems junked and abanoned New field wildcat	5,400 Mcf AF 3,300 psi/48 hrs. new pool discovery Weaver Road pool Seven Springs field	Dry and abandoned new field wildcat

COUNTY Permit Number	Tioga 20134	Tioga 20135	Venango 32935	Venango 35077	Venango 35078	Venango 35079	Venango 35090	Venango 35561	Venango 35562	Venango 35630
NAME OF WELL	Sisco-Pletcher Unit #1	Commonwealth of PA Tract 561 #1	Fisher & Young #2	Hines-Tarr Unit #1	Paul Oeeter #1	Paul Oeeter #2	Elizabeth Neidel #1	R. Moorehead #1	R. Moorhead #2	P. Oeeter #4
OPERATOR	Fairman Drilling Co. #F-3784	Adobe Oil & Gas Corporation	Cabot Oil & Gas Corporation	Mark Resources Corporation	Mark Resources Corporation	Mark Resources Corporation	Cabot Oil & Gas Corporation	'Mark Resources Corporation	Mark Resources Corporation	Mark Resources Corporation
TOWNSHIP	Oelmar	Elk	French Creek	Jackson	Jackson	Jackson	President	Jackson	Jackson	Jackson
QUADRANGLE	Antrim	Lee Fire Tower	Utica	Sugar Lake	Sugar Lake	Utica	President	Utica	Utica	Sugar Lake
LATITUDE	6,350 ft. S 41°40'00"	1,800 ft. S 41°35'00"	3,000 ft. S 41°25'00"	7,500 ft. S 41°32'30"	15,015 ft. S 41°32'30"	1,500 ft. S 41°30'00"	230 ft. S 41°25'00"	4,900 ft. S 41°30'00"	6,450 ft. S 41°30'00"	14,110 ft. S 41°32'30"
LONGITUDE	7,175 ft. W 77°20'00"	4,600 ft. W 77°32'30"	7,600 ft. W 79°52'30"	11,300 ft. W 79°52'30"	4,900 ft. W 79°52'30"	4,900 ft. W 79°52'30"	8,980 ft. W 79°30'00"	6,700 ft. W 79°52'30"	5,850 ft. W 79°52'30"	1,500 ft. W 79°52'30"
DATE COMPLETED	10-3-83	1-15-84	11-7-82	9-21-83	8-15-83	10-28-83	6-7-83	10-9-83	12-5-83	12-28-83
ELEVATION	1790 GR	1825 GR	1340	1530	1483	1414 GR	1526	1160 GR	1164 GR	1155 GR
LOGS RECEIVED AND LOGGED INTERVALS	FOC/GR: 0-6948 IL: 1660-6949 T: 6800-7186	LOT: 0-6153 CNL/GR: 1739-6130 IL/GR: 1739-6162 T: 1840-6165	DBC/CNL/GR: 0-5850 GR/GD: 550-5843	GR/CNL: 0-5634	GR/OBC/CNL: 0-5704 GR/GO: 600-5697 Strata: 0-5704	DBC/CNL/GR: 0-5688 GR/GD: 760-5681	DBC/CNL/GR: 794-6674 OLL/GR: 812-6660 SON/GR: 794-6662	OBC/CNL/GR: 0-5448 GR/GO: 600-5440 Strata: 4850-5360	OBC/CNL/GR: 0-5444 GR/GD: 545-5439 GR/PCL: 5050-5402 Strata: 5100-5440	DBC/CNL/GR: 0-5416 GR/GD: 510-5412 GR/PCL: 5050-5395 Strata: 515-5400
TULLY	5878-	5056-	3874-	3762-	3778-	3712-	4540-	3480-	3496-	3464-
LIMESTONE ONONDAGA CHERT	6948-	5951-	4102-	3964-	4004-	3934-	4844-	3698-	3712-	3690-
ORISKANY	6978-	Ridgeley 5980-	4226-		4130-	4060-	4921-	3826-	3846-	3823-
HELDERBERG KEYSER-BASS ISLANDS		6001-	4243- 4337-	4104-	4161- 4177-	4096- 4120-	4928- 5016-	3858- 3890-	3876-	3844-
SALINA GUELPH-LOCKPORT			4368- 5174-	4230- 5062-	4268- 5042-	4200- 4978-	5064- 5910-	3970- 4750-	3988- 4772-	3960- 4738-
CLINTON IRONDEQUOIT			5452- 5599-	5268- 5332-	5366- 5384-	5253- 5324-	6226- 6308-	5023- 5094-	5030- 5118-	5008- 5082-
MEDINA GRIMSBY WHIRLPOOL			5638- 5801-	5386- 5562-	5446- 5625-	5385- 5558-	6389- 6570-	5157- 5330-	5356- 5372-	4146- 5320-
QUEENSTON			5811-	5577-	5643-	5569-	6584-	5344-		5340-
PRODUCING FORMATION				Medina	Medina	Medina		Medina	Medina	Medina
PRODUCING INTERVAL				5433-5526	5489-5591	5430-5524		5198-5292	5235-5318	5180-5275
TOTAL DEPTH	7186	6165	5852	5852	5715	5691	6717	5344	5445	54[illegible]
DEEPEST FORMATION REACHED	Oriskany	Helderberg	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston
RESULTS	Plugged and abandoned extension South Wellsboro field	Plugged and abandoned New field wildcat	Ory and abandoned extension Takitezy pool Sugar Creek-Niles field	112 Mcf AF 1,380 psi/72 hrs. extension Beatty Run pool Cooperstown field	3,400 Mcf AF 1,630 psi/168 hrs. development Beatty Run pool Cooperstown field	3,816 Mcf AF 1,490 psi/168 hrs. development Beatty Run pool Cooperstown field	Ory and abandoned Deeper pool test Hampton-Strong field	2,600 Mcf AF 1,490 psi/72 hrs. development Beatty Run pool Cooperstown field	1,845 Mcf AF 1,480 psi/72 hrs. development Beatty Run pool Cooperstown field	[illegible] Mcf AF 1,510 psi/72 hr development Beatty [illegible] pool Cooperstown field

Figure 35. *(Continued).*

COUNTY Permit Number	Venango 35804	Venango 35847	Venango 36453	Venango 36455	Venango 36457	Venango 36460	Venango 36469	Venango 36828	Venango 36953	Venango 36991
NAME OF WELL	R. Allio #1	B. Borger #1	R. Rankin #1	Alexander Wuchevich #1	Joseph Zeitler #1	D. Shorts #2	Miese-Allio- Stanonis-Deeter #1	J. Swab #1	S. Stanonis #1	D. J. Levi #1
OPERATOR	Mark Resources Corporation	Mark Resources Corporation	Mark Resources Corporation	Cabot Oil & Gas Corporation	Cabot Oil & Gas Corporation	Mark Resources Corporation	Mark Resources Corporation	Cabot Oil & Gas Corporation	Mark Resources Corporation	Mark Resources Corporation
TOWNSHIP	Jackson	Jackson	Jackson	Canal	Canal	Jackson	Jackson	Canal	Jackson	Jackson
QUADRANGLE	Dempseytown	Utica	Utica	Utica	Utica	Dempseytown	Franklin	Utica	Franklin	Utica
LATITUDE	13,600 ft. S 41°32'30"	8,390 ft. S 41°30'00"	5,350 ft. S 41°30'00"	11,600 ft. S 41°30'00"	9,700 ft. S 41°30'00"	13,110 ft. S 41°32'30"	420 ft. S 41°30'00"	2,700 ft. S 41°30'00"	200 ft. S 41°30'00"	7,850 ft. S 41°30'00"
LONGITUDE	10,900 ft. W 79°50'00"	2,790 ft. W 79°52'30"	2,620 ft. W 79°52'30"	1,300 ft. W 79°57'30"	7,400 ft. W 79°55'00"	3,190 ft. W 79°50'00"	8,750 ft. W 79°50'00"	10,400 ft. W 79°52'30"	7,450 ft. W 79°50'00"	900 ft. W 79°52'30"
DATE COMPLETED	11-11-83	1-17-84	2-11-84	3-23-84	7-10-84	3-5-84	3-28-84	7-5-84	3-29-84	3-18-84
ELEVATION	1158 GR	1119 GR	1368 GR	1180 GR	1360 GR	1372 GR	1290 GR	1278 GR	1302 GR	1100 GR
LOGS RECEIVED AND LOGGED INTERVALS	DBC/CNL/GR: 0-5416 GR/GD: 530-4276 GR/PCL: 4960-5406 Strata: 0-5405	DBC/CNL/GR: 0-5463 GR/GD: 700-5459 GR/PCL: 5195-5385	DBC/CNL/GR: 0-5702 GR/GD: 700-5696 GR/PCL: 5300-5690	DBC/CNL/GR: 0-5432 GR/PCL: 4500-5408	DBC/GR: 636-5588 LL/GR: 636-5585	DBC/CNL/GR: 0-5688 GR/GD: 620-5679 Strata: 5380-5620	DBC/CNL/GR: 0-5592 GR/GD: 630-5586 GR/PCL: 5230-5574 Strata: 5300-5510	DBC/GR: 636-5499 GR/LL: 636-5487	DBC/CNL/GR: 0-5624 GR/GD: 640-5617 GR/PCL: 5240-5574 Strata: 5300-5600	DBC/CNL/GR: 0-5434 GR/GD: 536-5425 GR/PCL: 5080-5425 Strata: 5100-5340
TULLY	3566-	3486-	3706-	3506-	3668-	3706-	3628-	3602-	3650-	3470-
ONONDAGA LIMESTONE CHERT	3694-	3708-	3928-	3736-	3898-	3942-	3860-	3810-	3882-	3692-
ORISKANY	3826-	3838-	4054-	3877-	4035-	4069-	3990-	3939-	4010-	3821-
HELDERBERG KEYSER-BASS ISLANDS	3858-	3867-	4084-	3897-	4064-	4094-	4020-	3959-	4040-	3849-
SALINA GUELPH-LOCKPORT	3962- 4750-	3986- 4752-	4196- 4988-	4022- 4786-	4176- 4904-	4208- 4978-	4128- 4908-	4078- 4854-	4148- 4926-	3968- 4744-
CLINTON IRONDEQUOIT	5012-	5057- 5120-	5274- 5336-	5046- 5114-	5214- 5294-	5265- 5335-	5180- 5254-	5126- 5199-	5196- 5274-	5024- 5090-
MEDINA GRIMSBY WHIRLPOOL	5152- 5320-	5184- 5356-	5400- 5568-	5188- 5368-	5355- 5530-	5402- 5565-	5318- 5486-	5261- 5432-	5340- 5510-	5155- 5331-
QUEENSTON	5336-	5368-	5582-	5382-	5542-	5581-	5502-	5456-	5530-	5340-
PRODUCING FORMATION	Medina	Medina	Medina	Medina	Medina	Medina	Medina	Medina	Medina	Medina
PRODUCING INTERVAL	5189-5282	5242-5318	5478-5538	5230-5260	5417-5481	5443-5532	5363-5454	5283-5392	5375-5477	5196-5284
TOTAL DEPTH	5419	5466	5705	5450	5597	5690	5593	5505	5627	5435
DEEPEST FORMATION REACHED	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston
RESULTS	2,144 Mcf AF 1,750 psi/72 hrs. development Beatty Run pool Cooperstown field	845 Mcf AF 1,472 psi/72 hrs. development Beatty Run pool Cooperstown field	600 Mcf AF 1,480 psi/72 hrs. development Beatty Run pool Cooperstown field	753 Mcf AF 1,500 psi/48 hrs. development Canal pool McCune Run field	696 Mcf AF 1,290 psi/48 hrs. development Canal pool McCune Run field	298 Mcf AF 1,475 psi/72 hrs. extension Beatty Run pool Cooperstown field	400 Mcf AF 1,400 psi/72 hrs. development Beatty Run pool Cooperstown field	146 Mcf AF 1,230 psi/48 hrs. development Beatty Run pool Cooperstown field	1,500 Mcf AF 1,500 psi/72 hrs. development Beatty Run pool Cooperstown field	3,156 Mcf AF 1,500 psi/72 hrs. development Beatty Run pool Cooperstown field

COUNTY Permit Number	Venango 37576	Venango 37729	Venango 37760	Venango 37914	Warren 27696	Warren 29172	Warren 29480	Warren 32089	Warren 32208	Warren 32324
NAME OF WELL	James Murdock #1	M. L. Beatty #1-A	D. Klein #1	Marc Glasgow #1	Cornish #3	Gale & Arlene Hotchkiss #1	Lewis & Diane Enos #1	Bensink #4	M. Kirin #1	John M. Haniak #1
OPERATOR	Cabot Oil & Gas Corporation	Cabot Oil & Gas Corporation	Mark Resources Corporation	Mark Resources Corporation	Oilmark & Company #1	Bounty Oil and Gas Corporation	Bounty Oil and Gas Corporation	U. S. Energy Development Corp.	U. S. Energy Development Corp.	U. S. Energy Development Corp.
TOWNSHIP	Canal	Jackson	Jackson	Jackson	Freehold	Freehold	Farmington	Columbus	Columbus	Columbus
QUADRANGLE	Utica	Sugar Lake	Sugar Lake	Franklin	Lottsville	Lottsville	Russell	Columbus	Columbus	Columbus
LATITUDE	12,750 ft. S 41°30'00"	13,310 ft. S 41°32'30"	14,340 ft. S 41°35'00"	7,350 ft. S 41°30'00"	7,550 ft. S 41°57'30"	3,750 ft. S 41°57'30"	14,320 ft. S 42°00'00"	14,400 ft. S 42°00'00"	800 ft. S 41°57'30"	2,265 ft. S 41°57'30"
LONGITUDE	7,400 ft. W 79°57'30"	5,260 ft. W 79°52'30"	8,350 ft. W 79°52'30"	8,770 ft. W 79°50'00"	3,000 ft. W 79°25'00"	3,220 ft. W 79°22'30"	3,230 ft. W 79°12'30"	0 ft. W 79°35'00"	9,635 ft. W 79°30'00"	6,650 ft. W 79°32'30"
DATE COMPLETED	7-23-84	6-19-84	7-12-84	7-23-84	2-8-80	5-9-81	12-7-82	1-8-83	1-27-84	12-29-82
ELEVATION	1110 GR	1465 GR	1540 GR	1300 GR	1470 GR	1895 GR	1590 GR	1445 GR	1663 GR	1562 GR
LOGS RECEIVED AND LOGGED INTERVALS	DBC/GR: 512-5320 LL/GR: 512-5218	DBC/GR: 50-5644 LL/GR: 509-4797	CNL/GR: 0-5588 CBL/GR:4640-5581			DBC/GR: 309-5132	FDC/GR: 0-4938	DBC/CNL: 2423-4433 DI/LL: 2431-4435 Laser: 4050-4350 PCL: 4152-4317		DBC/CNL: 2549-4578 DI/LL: 2528-4570 Laser: 4240-4580 PCL: 4333-4469
TULLY	3404-	3750-	3702-	3688-		3414-	3318-	2704-	2969-	2858-
ONONDAGA LIMESTONE CHERT	3622-	3974-	3920-	3918-	3280-	3698-	3556-	2976-	3250-	3132-
ORISKANY	3759-	4104-	4070-	4042-				3165-		
HELDERBERG KEYSER-BASS ISLANDS	3792-	4126-	4090-	4076- 4192-		3882-	3620- 3672-	3175-	3418-	3314-
SALINA GUELPH-LOCKPORT	3902- 4640-	4240- 5008-	4192- 4916-	4250- 4929-		3906- 4494-	3696- 4329-	3214- 3781-	3506- 4054-	3386- 3930-
CLINTON IRONDEQUOIT	4948- 5015-	5276- 5351-	5206- 5267-	5240- 5302-	4416-	4743- 4834-	4569- 4672-	4006- 4104-	4269- 4382-	4178- 4252-
MEDINA GRIMSBY WHIRLPOOL	5094- 5278-	5411- 5584-	5338- 5496-	5440- 5538-	4454- 4620-	4875- 5036-	4706- 4856-	4158- 4304-	4420- 4583-	4288- 4456-
QUEENSTON	5284-	5610-	5508-	5556-	4633-	5052-	4868-	4320-	4598-	4472-
PRODUCING FORMATION	Medina	Medina	Medina	Medina	Medina	Medina	Medina	Medina	Medina	Medina
PRODUCING INTERVAL	5090-5188	5414-5542	5391-5445	5416-5536	4466-4628	4937-5045	4766-4829	4152-4317	4476-4593	4333-4469
TOTAL DEPTH	5332	5685	5630	5670	4697	5125	4950	4445	4717	4570
DEEPEST FORMATION REACHED	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston
RESULTS	1,200 Mcf AF 1,490 psi/48 hrs. development Canal pool McCune Run field	150 Mcf AF 1,340 psi/48 hrs. development Beatty Run pool Cooperstown field	1,980 Mcf AF 1,450 psi/72 hrs. extension Beatty Run pool Cooperstown field	1,900 Mcf AF 1,450 psi/72 hrs. extension Beatty Run pool Cooperstown field	300 Mcf AF 1,100 psi/72 hrs. extension Savko pool Stillwater field	50 Mcf Nat. 500 Mcf AF 1,340 psi/48 hrs. development Pikes Rocks pool Youngsville field	500 Mcf AF 1,300 psi/48 hrs. extension Loomis pool Sugar Grove field	150 Mcf AF 1,270 psi/72 hrs. development Brokenstraw field	4,830 Mcf AF 1,160 psi/72 hrs. development Dewey Corners pool Columbus field	243 Mcf AF 700 psi/48 hrs. development Dewey Corners pool Columbus field

Figure 35. *(Continued).*

COUNTY Permit Number	Warren 32360	Warren 32391	Warren 32414	Warren 32567	Warren 32687	Warren 32688	Warren 32689	Warren 32721	Warren 32722	Warren 32723
NAME OF WELL	Wilbur Hansen #4	E. Raymond #2	F. Tripp #1	Willis Koren #1	Walter Spitman #1	Walter Spitman #2	Walter Spitman #3	Paul Toplovich #2	J. Willis #2A	M. Messenger #2
OPERATOR	U. S. Energy Development Corp.	U. S. Energy Development Corp.	U. S. Energy Development Corp.	Monroe Resources, Ltd.	U. S. Energy Development Corp.	U. S. Energy Development Corp.	U. S. Energy Development Corp.	U. S. Energy Development Corp.	U. S. Energy Development Corp.	U. S. Energy Development Corp.
TOWNSHIP	Columbus	Columbus	Columbus	Freehold	Columbus	Columbus	Columbus	Columbus	Columbus	Columbus
QUADRANGLE	Columbus	Columbus	Columbus	Lottsville	Columbus	Columbus	Columbus	Columbus	Columbus	Columbus
LATITUDE	10,850 ft. S 42°00'00"	4,150 ft. S 42°00'00"	7,400 ft. S 42°00'00"	14,250 ft. S 42°00'00"	8,475 ft. S 42°00'00"	10,465 ft. S 42°00'00"	11,250 ft. S 42°00'00"	7,335 ft. S 42°00'00"	13,700 ft. S 42°00'00"	9,450 ft. S 42°00'00"
LONGITUDE	5,350 ft. W 79°35'00"	1,050 ft. W 79°35'00"	3,010 ft. W 79°35'00"	10,525 ft. W 79°25'00"	3,730 ft. W 79°32'30"	3,875 ft. W 79°32'30"	2,000 ft. W 79°32'30"	750 ft. W 79°32'30"	7,265 ft. W 79°32'30"	5,435 ft. W 79°32'30"
DATE COMPLETED	2-21-83	2-7-83	2-16-83	7-26-83	6-14-83	4-12-83	8-3-83	7-10-83	8-2-83	8-8-83
ELEVATION	1420 GR	1660 GR	1428 GR	1408 GR	1487 GR	1580 GR	1544 GR	1500 GR	1521 GR	1590 GR
LOGS RECEIVED AND LOGGED INTERVALS			DBC/CNL: 2296-4304 LL: 2296-4301 Laser: 4020-4306	DBC/CNL: 2500-4501 LL: 3600-4493	DBC/CNL: 414-4425 DLL: 824-4417 Laser: 4100-4426	DBC/CNL: 2535-4542 DLL: 2505-4539 Laser: 4200-4450	DBC/CNL: 2494-4535 LL: 2495-4532 Laser: 4200-4537	DBC/CNL: 2430-4440 DI/LL: 2430-4440 Laser: 4173-4310	DBC/CNL: 2499-4520 DI/LL: 2484-4516	DBC/CNL: 2548-4552 DI/LL: 2551-4553
TULLY		2823-	2606-	2794-	2714-	2816-	2804-	2717-	2804-	2829-
ONONDAGA LIMESTONE CHERT	2890-	3089-	2876-	3073-	2986-	3086-	3076-	2993-	3074-	3100-
ORISKANY	3068-				3164-			3174-		3281-
HELDERBERG KEYSER-BASS ISLANDS	3083-	3237-	3068-	3241-	3180-	3266-	3253-	3184-	3254-	3298-
SALINA GUELPH-LOCKPORT	3143- 3713-	3383- 3935-	3138- 3714-	3297- 3880-	3228- 3800-	3324- 3892-	3314- 3886-	3236- 3820-	3314- 3880-	3345- 3912-
CLINTON IRONDEQUOIT	3964- 4040-	4161- 4258-	3966- 4038-	4132- 4211-	4042- 4122-	4140- 4214-	4132- 4210-	4064- 4138-	4106- 4202-	4162- 4236-
MEDINA GRIMSBY WHIRLPOOL	4080- 4236-	4294- 4454-	4074- 4234-	4250- 4418-	4158- 4328-	4248- 4418-	4244- 4416-	4172- 4338-	4237- 4407-	4271- 4440-
QUEENSTON	4250-	4466-	4245-	4428-	4342-	4438-	4432-	4350-	4422-	4451-
PRODUCING FORMATION	Medina	Medina	Medina	Medina	Medina	Medina	Medina	Medina	Medina	Medina
PRODUCING INTERVAL	4132-4246		4124-4240	4297-4423	4243-4338	4295-4434	4302-4429	4259-4345	4271-4413	4313-4445
TOTAL DEPTH	4298	4590	4312	4542	4435	4556	4540	4446	4535	4557
DEEPEST FORMATION REACHED	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston
RESULTS	200 Mcf AF 900 psi/72 hrs. development Brokenstraw field	50 Mcf Nat. 600 psi/96 hrs. development Brokenstraw field	243 Mcf AF 1,260 psi/72 hrs. development Brokenstraw field	3,135 Mcf AF 1,120 psi/48 hrs. development Dewey Corners pool Columbus field	340 Mcf AF 1,190 psi/72 hrs. development Dewey Corners pool Columbus field	253 Mcf AF 1,180 psi/72 hrs. development Dewey Corners pool Columbus field	594 Mcf AF 1,195 psi/96 hrs. development Dewey Corners pool Columbus field	200 Mcf AF 1,050 psi/96 hrs. development Dewey Corners pool Columbus field	300 Mcf AF 1,150 psi/168 hrs. development Dewey Corners pool Columbus field	200 Mcf AF 1,050 psi/168 hrs. development Dewey Corners pool Columbus field

COUNTY Permit Number	Warren 33142	Warren 33143	Warren 33144	Warren 33234	Warren 33235	Warren 33237	Warren 33238	Warren 33242	Warren 33361	Warren 33365
NAME OF WELL	O. Curtis #5	Paul Toplovich #3	Paul Toplovich #6	Vera Robertson #1	Lillie Tubbs #1	Orren L. Smith #2	Emmit Young #3	Bert Stockton #1	William McChesney #4	George Lauger #1
OPERATOR	U. S. Energy Development Corp.	U. S. Energy Development Corp.	U. S. Energy Development Corp.	Berea Oil & Gas Corporation	Berea Oil & Gas Corporation	Berea Oil & Gas Corporation	Berea Oil & Gas Corporation	U. S. Energy Development Corp.	Berea Oil and Gas Corporation	Universal Resources Holdings, Inc.
TOWNSHIP	Columbus	Columbus	Columbus	Spring Creek	Spring Creek	Eldred	Eldred	Columbus	Spring Creek	Freehold
QUADRANGLE	Columbus	Columbus	Columbus	Spring Creek	Spring Creek	Spring Creek	Spring Creek	Columbus	Spring Creek	Lottsville
LATITUDE	875 ft. S 41°57'30"	10,375 ft. S 42°00'00"	12,965 ft. S 42°00'00"	4,100 ft. S 41°50'00"	11,750 ft. S 41°50'00"	5,950 ft. S 41°47'30"	500 ft. S 41°47'30"	7,140 ft. S 41°57'30"	3,180 ft. S 41°50'00"	250 ft. S 41°57'30"
LONGITUDE	4,035 ft. W 79°32'30"	270 ft. W 79°32'30"	735 ft. W 79°32'30"	10,200 ft. W 79°32'30"	5,200 ft. W 79°30'00"	1,400 ft. W 79°35'00"	8,200 ft. W 79°32'30"	9,665 ft. W 79°32'30"	6,930 ft. W 79°30'00"	7,930 ft. W 79°25'00"
DATE COMPLETED	11-4-83	10-6-83	10-31-83	10-8-83	9-29-83	9-12-83	9-3-83	1-5-84	9-21-83	2-2-84
ELEVATION	1625 GR	1501 GR	1593 GR	1679 GR	1745 GR	1740 GR	1587 GR	1423 GR	1692 GR	1391 GR
LOGS RECEIVED AND LOGGED INTERVALS	OBC/CNL: 2617-4626 LL: 2605-4623	OBC/CNL: 2163-4484 DLL: 2156-4481 Laser: 4145-4330	DBC/CNL: 402-4640 LL: 402-4636 Laser: 4060-4150	DBC/CNL: 511-5174 DI/LL: 511-5173 Laser: 3806-5070	OBC/CNL: 512-5408 DI/LL: 512-5408 Laser: 5100-5250	DBC/CNL: 548-5388 LL: 548-5380 GR: 0-5388 Laser: 5100-5250	OBC/CNL: 504-5235 LL: 704-5230 GR: 4800-5180 Laser: 4920-5070	DBC/CNL: 2499-4516 LL: 2495-4513 CBL: 3300-4215 Laser: 4200-4390	DBC/CNL: 498-5218 LL: 657-5212 Laser: 4900-5075	OBC/CNL: 2506-4518 LL: 3036-4502
TULLY	2930-	2740-	2868-	3407-	3600-	3596-	3420-	2767-	3445-	2798-
ONONDAGA LIMESTONE CHERT	3206-	3016-	3144-	3666-	3880-	3859-	3687-	3044-	3718-	3077-
ORISKANY		3192-		3810-	4020-	4008-	3834-		3863-	
HELDERBERG KEYSER-BASS ISLANDS	3402-	3208-	3316-	3821-	4032-	4024-	3847-	3218-	3873-	3243-
SALINA GUELPH-LOCKPORT	3452- 4004-	3252- 3824-	3376- 3950-	3870- 4501-	4082- 4732-	4076- 4716-	3895- 4547-	3290- 3846-	3920- 4542-	3298- 3878-
CLINTON IRONDEQUOIT	4260- 4331-	4080- 4152-	4202- 4276-	4748- 4837-	4983- 5078-	5001- 5056-	4797- 4890-	4100- 4173-	4795- 4884-	4110- 4211-
MEDINA GRIMSBY WHIRLPOOL	4367- 4535-	4188- 4356-	4310- 4482-	4876- 5048-	5120- 5294-	5080- 5268-	4914- 5099-	4221- 4376-	4934- 5093-	4248- 4414-
QUEENSTON	4548-	4370-	4496-	5059-	5305-	5280-	5111-	4389-	5105-	4430-
PRODUCING FORMATION	Medina	Medina	Medina	Medina	Medina	Medina	Medina	Medina	Medina	Medina
PRODUCING INTERVAL	4418-4541	4239-4363	4363-4490	4890-5053	5174-5301	5144-5280	4978-5108	4226-4384	4947-5103	4295-4425
TOTAL DEPTH	4630	4486	4642	5176	5373	5385	5237	4518	5240	4498
DEEPEST FORMATION REACHED	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston
RESULTS	2,169 Mcf AF 1,125 psi/72 hrs. development Dewey Corners pool Columbus field	3,500 Mcf AF 1,125 psi/72 hrs. development Dewey Corners pool Columbus field	2,500 Mcf AF 1,160 psi/72 hrs. development Dewey Corners pool Columbus field	1,275 Mcf AF 1,200 psi/72 hrs. development County Line field	1,300 Mcf AF 1,275 psi/72 hrs. extension Trimm pool Sanford field	1,200 Mcf AF 1,300 psi/72 hrs. development County Line field	1,100 Mcf AF 1,350 psi/72 hrs. development County Line field	1,000 Mcf Nat. 5,200 Mcf AF 1,275 psi/72 hrs. development Whites Run pool Columbus field	1,130 Mcf AF 1,050 psi/72 hrs. extension Trimm pool Sanford field	700 Mcf AF 1,700 psi/48 hrs. development Freeh[illegible] po[illegible] Stillwater field

Figure 35. *(Continued).*

COUNTY Permit Number	Warren 33366	Warren 33367	Warren 33511	Warren 33513	Warren 33514	Warren 33515	Warren 33516	Warren 33517	Warren 33518	Warren 33519
NAME OF WELL	Donald Little #1	Donald Little #1	J. Zajac #2	Paul Toplovich #5	Paul Toplovich #4	N. Lewis #1	D. Curtis #9	D. Curtis #6	O. Curtis #7	D. Curtis #8
OPERATOR	Universal Resources Holdings, Inc.	Universal Resources Holdings, Inc.	U. S. Energy Development Corp.	U. S. Energy Development Corp.	U. S. Energy Development Corp.	U. S. Energy Development Corp.	U. S. Energy Development Corp.	U. S. Energy Development Corp.	U. S. Energy Development Corp.	U. S. Energy Development Corp.
TOWNSHIP	Sugar Grove	Sugar Grove	Columbus	Columbus	Columbus	Columbus	Columbus	Columbus	Columbus	Columbus
QUADRANGLE	Lottsville	Lottsville	Columbus	Columbus	Columbus	Columbus	Columbus	Columbus	Columbus	Columbus
LATITUDE	8,250 ft. S 41°57'30"	8,610 ft. S 41°57'30"	10,300 ft. S 42°00'00"	13,365 ft. S 42°00'00"	11,765 ft. S 42°00'00"	14,250 ft. S 42°00'00"	3,150 ft. S 41°57'30"	2,775 ft. S 41°57'30"	1,235 ft. S 41°57'30"	14,300 ft. S 42°00'00"
LONGITUDE	4,900 ft. W 79°22'30"	3,090 ft. W 79°22'30"	4,865 ft. W 79°30'00"	8,750 ft. W 79°30'00"	10,350 ft. W 79°32'30"	10,670 ft. W 79°30'00"	1,735 ft. W 79°32'30"	3,650 ft. W 79°32'30"	2,135 ft. W 79°32'30"	2,165 ft. W 79°32'30"
DATE COMPLETED	9-28-83	10-5-83	11-11-83	12-9-83	12-3-83	11-27-83	12-17-83	11-22-83	11-13-83	12-9-83
ELEVATION	1750 GR	1839 GR	1545 GR	1527 GR	1500 GR	1160 GR	1526 GR	1613 GR	1605 GR	1678 GR
LOGS RECEIVED AND LOGGED INTERVALS	LL: 3080-5084	DBC/CNL: 3180-5188 LL: 3174-5184	DBC/CNL: 2549-4550 LL: 2541-4547	DBC/CNL: 2483-4515 DLL: 2483-4500	DBC/CNL: 2499-4488 DLL: 2499-4490	DBC/CNL: 2648-4648 DLL: 2648-4637	DBC/CNL: 2556-4574 DLL: 2555-4571	DBC/CNL: 2650-4652 DI/LL: 2650-4642	DBC/CNL: 2619-4649 DI/LL: 2607-4636	DBC/CNL: 2700-4717 DLL: 2715-4707
TULLY	3296-	3404-	2829-	2800-	2762-	2928-	2846-	2931-	2910-	2970-
ONONDAGA LIMESTONE CHERT	3575-	3683-	3117-	3078-	3038-	3208-	3128-	3209-	3186-	3247-
ORISKANY				3214-	3210-			3388-		
HELDERBERG KEYSER-BASS ISLANDS	3721-	3830-	3287-	3250-	3216-	3376-	3302-	3403-	3360-	3421-
SALINA GUELPH-LOCKPORT	3781- 4375-	3889- 4488-	3345- 3918-	3310- 3906-	3272- 3850-	3434- 4014-	3357- 3927-	3470- 4005-	3419- 3990-	3475- 4050-
CLINTON IRONDEQUOIT	4625- 4714-	4747- 4826-	4163- 4244-	4128- 4204-	4092- 4168-	4268- 4340-	4180- 4255-	4261- 4332-	4234- 4314-	4307- 4378-
MEDINA GRIMSBY WHIRLPOOL	4759- 4920-	4874- 5037-	4277- 4446-	4242- 4408-	4204- 4368-	4376- 4544-	4289- 4460-	4365- 4539-	4352- 4518-	4410- 4585-
QUEENSTON	4934-	5049-	4458-	4424-	4386-	4564-	4474-	4552-	4531-	4602-
PRODUCING FORMATION	Medina	Medina	Medina	Medina	Medina	Medina	Medina	Medina	Medina	Medina
PRODUCING INTERVAL	4807-4929	4930-5046	4334-4451	4259-4421	4215-4278	4431-4501	4336-4467	4397-4542	4410-4522	4412-4590
TOTAL DEPTH	5063	5186	4550	4520	4535	4650	4576	4657	4664	4719
DEEPEST FORMATION REACHED	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston
RESULTS	756 Mcf AF 1,205 psi/48 hrs. development Pikes Rocks pool Youngsville field	770 Mcf AF 1,310 psi/48 hrs. development Pikes Rocks pool Youngsville field	50 Mcf Nat. 2,570 Mcf AF 1,130 psi/72 hrs. development Oewey Corners pool Columbus field	4,327 Mcf AF 1,125 psi/72 hrs. development Dewey Corners pool Columbus field	2,882 Mcf AF 1,100 psi/72 hrs. development Dewey Corners pool Columbus field	3,464 Mcf AF 1,150 psi/72 hrs. development Dewey Corners pool Columbus field	886 Mcf AF 1,125 psi/72 hrs. development Dewey Corners pool Columbus field	2,278 Mcf AF 1,150 psi/72 hrs. development Oewey Corners pool Columbus field	2,069 Mcf AF 1,125 psi/72 hrs. development Dewey Corners pool Columbus field	850 Mcf AF 1,130 psi/72 hrs. development Dewey Corners pool Columbus field

COUNTY Permit Number	Warren 33523	Warren 33646	Warren 33831	Warren 33833	Warren 33834	Warren 33835	Warren 33872	Warren 33873	Warren 33914	Warren 33939
NAME OF WELL	L. Stockton #1	T. Reed #2	Toplovich Estate #1	I. Oyer #1	W. W. Hammond #1	M. Kirin #1	R. Friedel #1	R. Friedel #2	Bittinger #1	Porter Unit #1
OPERATOR	U. S. Energy Development Corp.	U. S. Energy Development Corp.	U. S. Energy Development Corp.	U. S. Energy Development Corp.	U. S. Energy Development Corp.	U. S. Energy Development Corp.	U. S. Energy Development Corp.	U. S. Energy Development Corp.	U. S. Energy Development Corp.	Penn Ohio Energy Corp.
TOWNSHIP	Columbus	Columbus	Columbus	Freehold	Columbus	Columbus	Columbus	Columbus	Columbus	Columbus
QUADRANGLE	Columbus	Columbus	Columbus	Columbus	Columbus	Columbus	Columbus	Columbus	Columbus	Lottsville
LATITUDE	7,000 ft. S 41°57'30"	4,330 ft. S 42°00'00"	9,270 ft. S 42°00'00"	6,435 ft. S 42°00'00"	5,900 ft. S 42°00'00"	800 ft. S 41°57'30"	8,165 ft. S 41°57'30"	9,935 ft. S 41°57'30"	2,260 ft. S 42°00'00"	14,360 ft. S 41°57'30"
LONGITUDE	6,380 ft. W 79°32'30"	8,000 ft. W 79°30'00"	9,330 ft. W 79°30'00"	3,000 ft. W 79°30'00"	9,265 ft. W 79°30'00"	9,635 ft. W 79°30'00"	7,165 ft. W 79°30'00"	6,200 ft. W 79°30'00"	11,205 ft. W 79°30'00"	9,750 ft. W 79°27'30"
DATE COMPLETED	1-25-84	1-2-84	11-21-83	1-31-84	12-15-83	1-27-84	12-14-83	12-21-83	12-29-83	10-17-84
ELEVATION	1443 GR	1630 GR	1467 GR	1527 GR	1717 GR	1663 GR	1573 GR	1656 GR	1518 GR	1689 GR
LOGS RECEIVED AND LOGGED INTERVALS	DBC/CNL: 2499-4516 GR: 4080-4516 LL: 2495-4513	OBC/CNL: 2510-4562 OLL: 2533-4546	DBC/CNL: 2516-4446 GR: 4050-4396 OLL: 2513-4436	DBC/CNL: 2489-4504 GR: 4100-4473 LL: 2493-4500	DBC/CNL: 2632-4657 OLL: 2632-4646	OBC/CNL: 2677-4714 GR: 4300-4676 DLL: 2589-4702	OBC/CNL: 2726-4722 OI/LL: 2726-4723 T: 2727-4724	OBC/CNL: 2738-4763 OI/LL: 2760-4763	OBC/CNL: 411-4429 GR: 4000-4402 OLL: 411-4407	OBC/CNL: 2906-4908 LL: 4623-4905 Laser: 4680-4910
TULLY	2766-	2846-	2700-	2781-	2908-	2970-	2972-	3070-	2678-	3180-
ONONDAGA LIMESTONE CHERT	3044-	3132-	2980-	3014-	3190-	3250-	3260-	3358-	2954-	3464-
ORISKANY				3240-						3618-
HELDERBERG KEYSER-BASS ISLANDS	3220-	3310-	3156-	3254-	3366-	3419-	3430-	3525-	3144-	3637-
SALINA GUELPH-LOCKPORT	3298- 3846-	3370- 3932-	3214- 3788-	3300- 3872-	3428- 4002-	3482- 4066-	3490- 4072-	3587- 4164-	3208- 3784-	3682- 4264-
CLINTON IRONDEQUOIT	4100- 4173-	4190- 4260-	4054- 4114-	4120- 4196-	4256- 4330-	4304- 4382-	4310- 4394-	4406- 4498-	4038- 4114-	4512- 4600-
MEDINA GRIMSBY WHIRLPOOL	4211- 4376-	4296- 4458-	4150- 4318-	4236- 4398-	4368- 4532-	4420- 4586-	4428- 4597-	4530- 4706-	4150- 4317-	4637- 4803-
QUEENSTON	4388-	4470-	4332-		4546-	4598-	4612-	4718-	4330-	4816-
PRODUCING FORMATION	Medina	Medina	Medina	Medina	Medina	Medina	Medina	Medina	Medina	Medina
PRODUCING INTERVAL	4250-4390	4345-4464	4203-4326	4295-4405	4410-4538	4476-4593	4497-4608	4579-4710	4210-4327	4684-481[illegible]
TOTAL DEPTH	4544	4554	4448	4529	4676	4717	4724	4819	4467	493[illegible]
DEEPEST FORMATION REACHED	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston
RESULTS	2,530 Mcf AF 1,240 psi/72 hrs. development Dewey Corners pool Columbus field	1,778 Mcf AF 1,200 psi/72 hrs. development Dewey Corners pool Columbus field	50 Mcf Nat. 5,120 Mcf AF 1,200 psi/72 hrs. development Dewey Corners pool Columbus field	3,590 Mcf AF 1,200 psi/72 hrs. development Dewey Corners pool Columbus field	1,178 Mcf AF 1,135 psi/72 hrs. development Dewey Corners pool Columbus field	4,830 Mcf AF 1,160 psi/72 hrs. development Dewey Corners pool Columbus field	100 Mcf Nat. 2,820 Mcf AF 1,290 psi/72 hrs. development Whites Run pool Columbus field	2,816 Mcf AF 1,075 psi/72 hrs. development Whites Run pool Columbus field	300 Mcf Nat. 5,680 Mcf AF 1,250 psi/72 hrs. development Dewey Corners pool Columbus field	756 Mcf AF 1,375 psi 48 hr development Whites Run pool Columbus field

Figure 35. *(Continued).*

COUNTY Permit Number	Warren 33940	Warren 33941	Warren 33943	Warren 33944	Warren 33949	Warren 33950	Warren 33951	Warren 33952	Warren 33954	Warren 33956
NAME OF WELL	Walters Unit #1	Zeyzus Unit #1	Fred Jensen #1	Bittenger #2	Rensma Stephens #1	J. Campbell #1	Cochran Caldwell #1Q	Cochran #234 #1	H. Colby #2	Priscilla & Chester Kibbey, #1
OPERATOR	Penn Ohio Energy Corp.	Penn Ohio Energy Corp.	U. S. Energy Development Corp.	U. S. Energy Development Corp.	Quaker State Resources	Quaker State Resources	Quaker State Resources	Quaker State Oil Refining Corp.	U. S. Energy Oevelopment Corp.	Mitchell Energy Corporation
TOWNSHIP	Columbus	Columbus	Columbus	Columbus	Southwest	Southwest	Eldred	Southwest	Columbus	Pittsfield
QUADRANGLE	Columbus	Columbus	Columbus	Columbus	Grand Valley	Grand Valley	Grand Valley	Grand Valley	Columbus	Pittsfield
LATITUDE	8,460 ft. S 41°57'30"	11,850 ft. S 41°57'30"	1,470 ft. S 41°57'30"	990 ft. S 42°00'00"	6,300 ft. S 41°40'00"	6,600 ft. S 41°42'30"	12,250 ft. S 41°45'00"	6,250 ft. S 41°42'30"	6,675 ft. S 42°00'00"	7,740 ft. S 41°52'30"
LONGITUDE	5,010 ft. W 79°30'00"	10,460 ft. W 79°30'00"	135 ft. W 79°32'30"	9,700 ft. W 79°30'00"	5,700 ft. W 79°30'00"	1,000 ft. W 79°32'30"	6,050 ft. W 79°32'30"	700 ft. W 79°30'00"	9,595 ft. W 79°32'30"	5,930 ft. W 79°22'30"
DATE COMPLETED	1-27-84	1-11-84	1-19-84	1-29-84	1-11-84	12-15-83	12-30-83	1-21-84	1-20-84	11-22-83
ELEVATION	1512 GR	1602 GR	1628 GR	1621 GR	1633 GR	1610 GR	1630 GR	1660 GR	1600 GR	1285 GR
LOGS RECEIVED AND LOGGED INTERVALS	DBC/CNL: 824-4660 OI/LL: 2569-4660 Laser: 4380-4662	OBC/CNL: 2700-4694 LL: 2698-4682 Laser: 4520-4696	OBC/CNL: 2550-4537 OLL: 2624-4659 GR: 4300-4586	DBC/CNL: 2586-4586 OLL: 2586-4574					DBC/CNL: 2501-4516 OLL: 3605-5603 Tracer/GR: 4000-4386	OBC/CNL/T: 398-4882 DI/LL: 398-4881
TULLY	2898-	3010-	2788-	2808-	4004-	3802-	3740-	3928-	2762-	3096-
ONONDAGA LIMESTONE CHERT	3186-	3298-	3064-	3084-	4292-	4088-	4016-	4213-	3028-	3378-
ORISKANY	3356-	3470-	3236-	3271-	4380-	4186-	4110-	4284-		
HELDERBERG KEYSER-BASS ISLANDS	3370-	3488-	3238-	3286-	4394- 4505-	4200- 4302-	4154- 4224-	4314- 4417-	3213-	3510-
SALINA GUELPH-LOCKPORT	3416- 3989-	3532- 4102-	3300- 3882-	3334- 3888-	4561- 5182-	4343- 4947-	4258- 4852-	4468- 5080-	3281- 3864-	3571- 4217-
CLINTON IRONDEQUOIT	4244- 4324-	4350- 4436-	4132- 4213-	4139- 4210-	5412- 5546-	5187- 5318-	5096- 5226-	5305- 5438-	4098- 4187-	4470- 4566-
MEDINA GRIMSBY WHIRLPOOL	4360- 4530-	4470- 4646-	4254- 4414-	4249- 4412-	5599- 5650- 5771-	5364- 5416- 5542-	5272- 5329- 5449-	5487- 5542- 5662-	4228- 4384-	4611- 4780-
QUEENSTON	4542-	4660-	4430-	4430-	5783-	5556-	5460-	5678-	4396-	4791-
PRODUCING FORMATION	Medina	Medina	Medina	Medina	Medina	Medina	Medina	Medina	Medina	Medina
PRODUCING INTERVAL	4405-4534	4525-4649	4420-4554	4415-4427	5655-5780	5423-5502	5332-5459	5544-5630	4260-4391	4619-4736
TOTAL DEPTH	4670	4740	4682	4588	5922	5648	5586	5895	4519	4910
DEEPEST FORMATION REACHED	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston
RESULTS	205 Mcf AF 1,275 psi/48 hrs. development Whites Run pool Columbus field	697 Mcf AF 1,215 psi/48 hrs. development Whites Run pool Columbus field	1,020 Mcf AF 1,000 psi/72 hrs. development Dewey Corners pool Columbus field	554 Mcf Nat. 1,100 psi/72 hrs. development Oewey Corners pool Columbus field	1,750 Mcf AF 1,450 psi/48 hrs. Oeeper pool discovery Seldom Seen pool Colorado field	1,700 Mcf AF 1,310 psi/48 hrs. extension Campbell Creek pool Goodwill Hill- Grand Valley field	1,700 Mcf AF 1,350 psi/48 hrs. extension Trimm pool Sanford field	1,650 Mcf AF 1,350 psi/48 hrs. extension Campbell Creek pool Goodwill Hill- Grand Valley field	64 Mcf AF 975 psi/72 hrs. development Oewey Corners pool Columbus field	96 Mcf AF 1,235 psi/240 hrs. extension Blue Eye pool Youngsville field

COUNTY Permit Number	Warren 34302	Warren 34304	Warren 34325	Warren 34474	Warren 34476	Warren 34478	Warren 34492	Warren 34703	Warren 34821	Warren 35061
NAME OF WELL	Paul Pirozzola #1	W. Hudson #1	L. Werner #1	Fred Jensen, Sr. #1	Carroll Stockton #1	Max L. Bennink #1	Paul Mitchell #4	Swart Drilling Unit #1	K. Sylvester #1	George Lauger #S-3
OPERATOR	U. S. Energy Development Corp.	U. S. Energy Development Corp.	Mitchell Energy Corporation	Universal Resources Holdings, Inc.	Universal Resources Holdings, Inc.	N.E.A. Cross Company	Universal Resources Holdings, Inc.	Universal Resources Holdings, Inc.	U. S. Energy Development Corp.	U. S. Energy Development Corp.
TOWNSHIP	Columbus	Columbus	Pine Grove	Columbus	Columbus	Columbus	Spring Creek	Spring Creek	Freehold	Columbus
QUADRANGLE	Columbus	Columbus	Scandia	Columbus	Columbus	Columbus	Spring Creek	Spring Creek	Columbus	Columbus
LATITUDE	8,050 ft. S 42°00'00"	6,835 ft. S 42°00'00"	2,150 ft. S 41°57'30"	8,425 ft. S 41°57'30"	8,,950 ft. S 41°57'30"	8,000 ft. S 41°57'30"	1,075 ft. S 41°50'00"	5,450 ft. S 41°52'30"	7,450 ft. S 42°00'00"	11,125 ft. S 42°00'00"
LONGITUDE	330 ft. W 79°35'00"	7,575 ft. W 79°32'30"	8,580 ft. W 79°02'30"	0 ft. W 79°35'00"	9,460 ft. W 79°32'30"	8,650 ft. W 79°32'30"	1,525 ft. W 79°32'30"	9,600 ft. W 79°32'30"	1,750 ft. W 79°30'00"	8,500 ft. W 79°30'00"
DATE COMPLETED	1-7-84	1-10-84	12-7-83	1-10-84	1-18-84	4-1-84	6-9-84	6-15-84	3-23-84	2-14-84
ELEVATION	1465 GR	1548 GR	1958 GR	1442 GR	1541 GR	1470 GR	1709 GR	1698 GR	1680 GR	1458 GR
LOGS RECEIVED AND LOGGED INTERVALS	OBC/CNL: 2396-4412 OLL: 2387-4400 GR: 4040-4384	OBC/CNL: 2428-4476 LL: 2445-4470 GR: 4150-4444	FOC/CNL: 604-5476 OI/LL: 604-5476		DBC/CNL: 2618-4623 LL: 2621-4618		OBC/CNL: 3172-5174 LL: 3172-5171	OBC/CNL: 3029-5076 LL: 3050-5074	GR: 4300-4644	
TULLY	2663-	2742-	3730-	2752-	2897-	2812-	3438-	3282-	2947-	
ONONDAGA LIMESTONE ONONDAGA CHERT	2930-	3010-	4040-	3062-	3172-	3090-	3702-	3546-	3229-	2996-
ORISKANY	3128-	3198-	4137-		3344-			3707-		
HELDERBERG KEYSER-BASS ISLANDS	3134-	3204-	4172- 4178-		3365-		3844-	3731-	3404-	3169-
SALINA GUELPH-LOCKPORT	3188- 3779-	3262- 3835-	4206- 4998-	3590-	3408- 3982-		3906- 4514-	3776- 4410-	3488- 4030-	3255- 3794-
CLINTON IRONDEQUOIT	4018- 4090-	4088- 4161-	5147- 5260-	4100- 4210-	4250- 4314-	4221-	4788- 4852-	4680- 4736-	4254- 4357-	4030- 4121-
MEDINA GRIMSBY WHIRLPOOL	4129- 4286-	4200- 4360-	5308-	4250- 4412-	4354- 4514-	4240- 4420-	4896- 5064-	4784- 4942-	4395- 4558-	4157- 4321-
QUEENSTON	4299-	4370-		4430-	4530-	4440-	5072-	4960-	4576-	4336-
PRODUCING FORMATION	Medina	Medina	Medina	Medina	Medina	Medina	Medina	Medina	Medina	Medina
PRODUCING INTERVAL	4203-4293	4235-4367	5341-5421	4418-4292	4415-4528	4329-4434	4945-5068	4834-4957	4456-4567	4200-4329
TOTAL DEPTH	4414	4478	5560	4540	4643	4552	5176	5078	4680	4434
DEEPEST FORMATION REACHED	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston	Queenston
RESULTS	IP not reported 1,000 psi/72 hrs. development Brokenstraw field	240 Mcf AF 1,150 psi/72 hrs. development Dewey Corners pool Columbus field	75 Mcf AF 1,220 psi/144 hrs. deeper pool discovery Fox Hill pool Russell field	702 Mcf AF 1,220 psi/48 hrs. development Whites Run pool Columbus field	860 Mcf AF 1,200 psi/48 hrs. development Whites Run pool Columbus field	2,800 Mcf AF 1,160 psi/48 hrs. development Whites Run pool Columbus field	955 Mcf AF 1,280 psi/48 hrs. development Trimm pool Sanford field	1,509 Mcf AF 1,225 psi/48 hrs. deeper pool discovery West Spring Creek pool Spring Creek field	1,860 Mcf AF 1,200 psi/72 hrs. development Dewey Corners pool Columbus field	5,120 Mcf AF 1,[illegible] psi 7[illegible] hr development Dewey [illegible] p[illegible] Columbus field

Figure 35. *(Continued).*

COUNTY Permit Number	Washington 21446									
NAME OF WELL	John Hunter #1									
OPERATOR	W. J. Lydic, Incorporated									
TOWNSHIP	Hopewell									
QUADRANGLE	Washington West									
LATITUDE	7,000 ft. S 40°15'00"									
LONGITUDE	2,300 ft. W 80°20'00"									
DATE COMPLETED	7-2-82									
ELEVATION	1357									
LOGS RECEIVED AND LOGGED INTERVALS	GR/DBC/CNL: 0-6827 GR/T/S: 1800-6824 GR/I: 1871-6820 GR/CBL/PCL:2700-6688									
TULLY	6442- Marcellus 6576-									
ONONDAGA LIMESTONE CHERT	6702- 6734-									
ORISKANY										
HELDERBERG KEYSER-BASS ISLANDS										
SALINA GUELPH-LOCKPORT										
CLINTON IRONDEQUOIT										
MEDINA GRIMSBY WHIRLPOOL										
QUEENSTON										
PRODUCING FORMATION	Rhinestreet, Sonyea Genesee & Marcellus									
PRODUCING INTERVAL	6056-6687									
TOTAL DEPTH	6828									
DEEPEST FORMATION REACHED	Huntersville Chert									
RESULTS	5 Mcf Nat. 70 Mcf AF 1,000 psi/? hrs. development Garrett Hill pool Buffalo field									

ISBN: 0-8182-0074-X